THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. NOVEMBER 15, 1894. CHICAGO, ILL. NUMBER 46

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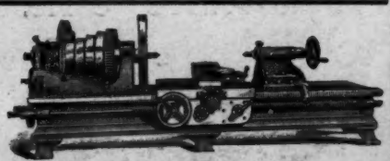

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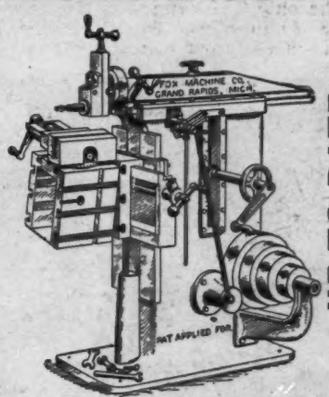

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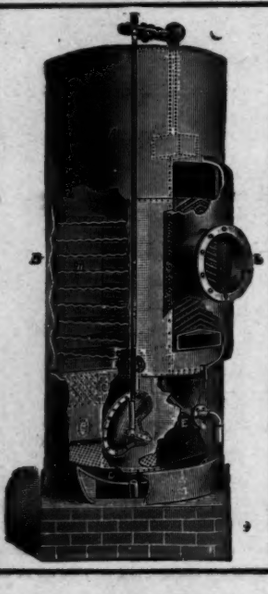

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75 "	40 "	"	"	"	"	
180 "	52 "	"	"	"	"	
200 "	60 "	"	"	"	"	

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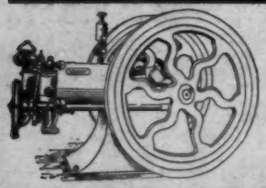

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CHEMISTS AND ENGINEERS.

THE IRON TRADE REVIEW

VOLUME XXVII. CLEVELAND, O. NOVEMBER 15, 1894. CHICAGO, ILL. NUMBER 46.

THE WEEK IN IRON CIRCLES.

GENERAL FEATURES.

The sentimental improvement in the iron trade resulting from the elections has not developed into anything more tangible as yet. It does not seem to be sufficient to offset the slowing down that comes as the end of the year approaches. Here and there increased inquiry is noted, but uncertainty about prices is everywhere a factor. There is no improvement to record and that is equivalent to saying that a downward tendency appears in some instances. A change for the better after the new year comes in is a common prediction and the refusal of sellers to do any large business on the present low basis is a factor to the good. Reports of an impending coal strike are disquieting. In the Connellsville region there is some uneasiness over the rumors that the men will be called out of the mines, and in a few instances furnace orders have been increased. The natural effect of strike talk would be firmness in the pig iron market, especially for Bessemer; but the situation at Pittsburg has shown a contrary tendency in the week just ending. Bessemer has been offered at $10 in the valley, or $10.65 Pittsburg, and brokers' offers are on a basis of $10.50 Pittsburg. It would appear that the advance in Bessemer three weeks ago has been lost and that the market has gone to the lowest point since the coke strike. While some accumulation has taken place, it is not considered sufficient to have caused the decline in price. It is conceded, moreover, that the purchase of a good-sized block of Bessemer pig by one of the steel companies would be promptly responded to by an improved market. Certainly at the present value consumers would not assume any risk. The market for foundry iron gives little present encouragement to hopes of an advance. Reports still come of low Southern iron at Eastern points and cheap water freights have assisted producers in getting into seaboard markets. There are evidences that even on the low cost basis shown by competent authority to be possible to some Southern producers, a heavy strain is put on others by prices that have been made recently. The Lake Superior charcoal market is drifting toward a $12.50 basis, though some furnaces make sales of best brands to long-time customers, without going to that depth. Gray forge has sold at Pittsburg considerably below a $9 valley basis.

THE CLEVELAND OUTLOOK.

The present week is expected practically to wind up Lake Superior ore shipments. A strike at the Biwabik ended shipments at that property a little earlier than was counted on and made the Duluth rate 90c, instead of $1 for a few days. At Ashland some difficulty has been experienced owing to frozen ore and short labor supply. Some inquiry from furnacemen has attended the closing up of shipping operations and a few sales have been made, including some low phosphorus ore that will be used with other grades close to the Bessemer line. The supplies of standard Bessemer ores are not found to be large and one instance is noted in which a mixture will be recast because the old ores were not available in the desired quantities. The outlook is for a moderate scale of operations on the old ranges in the coming winter. Labor is not plenty. There has been a scattering of surfacemen and of some miners to the woods for the winter and the reliable men at mining centers will not be more than adequate to the work that will be done. Properties now closed are not expected to be open. Stock piles of Bessemer ores have all been brought down, and winter work begins with none of the reserve that last year was of large proportions, particularly on the Gogebic range. If the furnaces supplied with Lake Superior Bessemers run through the winter at anything like the present pace there will be very little ore of that description on docks or in furnace yards when navigation opens. The feeling is general, and it is shared by furnacemen, that another season will see higher prices for standard Bessemer ores. How much higher is the problem that will be worked out in the next four months.

Pig Iron. The weaker feeling in Bessemer iron noted a week ago has continued. Producers are generally meeting the situation by declining to make forward contracts on the basis talked of. Some of them are still making deliveries of $9.75 Bessemer, sold last spring. They believe that conditions early in the year will bring an advance and they prefer not to enter into new engagements until the elements in the situation for '95 are more clearly developed. Other furnaces, not tied up on contracts, are piling iron rather than take the market price, which is $10.65 Pittsburg and a shade lower. These argue that raw materials will probably not be bought in 1895 on the present basis and that an advance is inevitable on that account, apart from any consideration of enlarged demand. Here and there a furnace, with low ore contracts running well into next year, is willing to sell sparingly at current prices. The drift of the market seems to be against any further weakening in Bessemer and against any maintenance, after the turn of the year, of the basis now discussed by brokers. Foundry irons are still weak, thought the volume of sales in this market holds up fairly well, and the foundry si uation is slowly gaining. A Central Ohio contract for 1,000 tons is to be let this week, deliveries running through a year. The coke situation has developed nothing; but there are signs that are construed as pointing toward a combination on higher prices.

Finished Material. A local shipyard has asked for prices on upwards of 1,000 tons of plates for a new boat that is talked of, but the matter is still in abeyance, and an Ohio agricultural concern contracts this week for a considerable quantity of iron and steel bars and other material. These constitute the only large business that is talked about among the mills. There is a fair trade in bar iron and plates in smaller lots, with prices unchanged. The structural demand is not strong; prices are nominally 1.25c. @ 1.35c., Pittsburg, but the lower figure has been shaded. A fair amount of bridge work is on hand at the shops, but very little new business is coming up on railroad account. In general the finished material market is waiting, but the feeling for the future is entirely hopeful.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

While the immediate effects of the election are not marked in most classes of material, there is no doubt that there is a decidedly better feeling among the trade, and there is every prospect for better business in the near future. Buyers, however, seem inclined to wait until after the first of the year before laying in large stocks, and it is likely that what buying is done will be in small lots and for immediate needs. Indications all point to a considerable increase in business after January 1, when stock taking will be finished and consumers will be in shape to replenish.

PIG IRON.—Consumers and dealers alike are very much more cheerful since the election, and are inclined to take a decidedly optimistic view of affairs. The effect has been felt already to some slight extent in orders, as two or three buyers who have been in the market for some time have been holding off until after the election, and last week placed orders for their maximum needs. One sale of 2,000 tons, three of 1,000 and several of 500 and down, of local iron were made, and there are still several buyers in the market who will probably close some time this week or next. Southern iron was more quiet, and only a few sales were made, none of them of large size. Lake Superior charcoal was dull, with only a small carload trade. Prices are unchanged:

Lake Sup Charcoal.....	$13 00@14 50	Southern No. 2 Soft.....	10 00@10 25
Local Coke Fdy. No. 1...	10 25@10 50	South'n Silveries No. 1.	$11 50@11 75
Local Coke Fdy. No. 2...	10 00@10 25	South'n Silveries No. 2.	11 25@11 50
Local Coke Fdy. No. 3...	9 50@10 00	Jackson Co. Silveries...	15 00@16 00
Local Scotch Fdy. No. 1.	10 75@11 00	Ohio Silveries No. 1.....	14 00@14 50
Local Scotch Fdy. No. 2.	10 00@10 50	Ohio Silveries No. 2.....	13 00@13 50
Local Scotch Fdy. No. 3.	9 50@10 00	Ohio Strong Softeners...	13 00@13 50
South'n Coke No. 1.....	11 00@11 25	Alabama Car Wheel.....	17 50@18 00
South'n Coke No. 2.....	10 25@10 50	Malleable Bessemer.....	10 50@11 25
South'n Coke No. 3.....	10 00@10 25	Coke Bessemer	11 25@11 50
Southern No. 1 Soft.....	10 25@10 50		

BARS.—Business has been quiet, and will probably remain so until after the first of the year. The results of the election imparted a more cheerful turn to the market, but have not directly influenced the volume of trade as yet. Prices are still made at 1.05c for common iron, 1.15c for guaranteed, and 1.25c for steel bars.

STRUCTURAL MATERIAL.—The only business of any size closed last week was 500 tons for a building in Dubuque, Ia., which went to Pittsburg. The general market is quieter, caused by the weather, which has not been favorable to building operations. Prices are as last made: Beams, 1.45c; angles, 1.45c; plates, 1.45c; tees, 1.65c. Small lots from stock are quoted at ¼c to ½c higher.

RAILS AND TRACK SUPPLIES.—The works of the local company are supplied with orders to keep them running nearly to the end of the year, and by that time it is expected that buying will commence in large quantities. Quotations are still unchanged: Rails, $25 to $27; splice bars, 1.25c to 1.30c; track bolts, 2c. to 2.10c; spikes, 1.75c. to 1.80c.

BILLETS AND RODS.—A good demand is noted for billets for delivery the first half of 1895, and in one case at least, inquiry was made for the year's supply. No sales are being made as yet for this delivery, and prices are held nominally at $17. Rods are quiet and only nominal at $24.

PLATES.—The demand keeps up well, and is rather on the increase, both for delivery from mill and store. Prices are made: Tank steel, 1.40c to 1.50c; flange steel, 1.65c to 1.70c; firebox steel, 1.75c to 5c; boiler tubes, 75 per cent. discount.

MERCHANT STEEL.—Trade has fallen off a little, although there is still a fair demand. Prices are made as follows: Open-hearth spring, tire and machinery steel, 1.75c to 1.80c; smooth finished machinery and tire, 1.50c. to 1.60c.; Bessemer bars 1.40c. to 1.45c.; tool steel, 5.50c to 7.50c.; specials, 11c.

SHEETS.—There is a good demand for black sheets, and several good orders have been placed for mill shipment. Prices are made on a basis of 2.35c. to 2.40c. for No. 27 common iron; steel sheets are quoted at 2.45c to 2.50c. Trade has been quiet in galvanized sheets, which are quoted at 75 and 10 and 5 to 75 and 15 per cent. discount, on mill shipments.

OLD RAILS AND WHEELS.—A sale of 1,000 tons of old wheels is reported, at $10, Chicago. Old iron rails are quiet and nominal at $11.25; old steel rails, $7.50 for short and $10.50 for long lengths.

SCRAP.—Several sales of good-sized lots were made last week, and the prospects appear to be brightening. Prices are as follows: No. 1 forge, $8.50 to $9.00; No. 1 mill, $7; No. 1 machinery, $7.50; axles, $13.50; cast borings, $3.50; wrought turnings, $5.00; axle turnings, $6.50; mixed steel, $5.50; heavy cast, $7 to $7.50; stove plates, $5 to $5.25; heavy melting steel, $7 to $7.25.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The better feeling inspired by the protection victory of last week came at a time when prices had reached the lowest point since the general resumption following the coke strike. There is no well defined tendency in the market. Neither side is making any decisive move. Some trading in Bessemer at $10.65 and a shade lower is reported and in billets at $15.50 and $15.65. All that Bessemer gained a few weeks ago has been lost and more. Yet it is everywhere conceded that the balance between consumption and production is as yet quite even and the weakness is not due so much to present accumulations as to the general belief that considerable iron will be piled in the next six weeks. The finished material trade is only fairly active and mills, while generally employed, are not finding new work as readily as formerly. There is, perhaps, a gain in inquiries the past week, and some producers are predicting a buying movement in finished material as the result of the stimulus lately given to confidence, both in the monetary policy of the government and in the industrial policy that will prevail in the next two or three years. It is certain that no better time than the present could be chosen for the anticipation of buyer's wants, and the fact that stocks have been kept low favors the views of the more sanguine. Structural work shows a smaller volume though local mills have taken some large work west as well as east in the past two weeks, at figures shading 1.25c for beams and channels. Structural mills are running on somewhat shorter time. In plates demand is only moderate and 1.15c and 1.20c have been named in connection with some contracts for tank, in spite of the advance recently announced by one mill. Wire rods are a neglected market. The starting of two tin plate plants is the beginning of what promises to be a long struggle. Thus far no increase in the call for steel or tin plate account is noted. Some sales of billets have been made to the East, and $15.35 from mills outside the Pittsburg district has been done. Foundry and forge irons are weaker, and the latter especially has shown some low prices, $9.35 being named in several sales.

Boston. Business seems to be picking up somewhat among some of the foundries, notably those located in Southern New England, and while distributors

of pig iron are not putting out any more than they were a few weeks ago, still the general feeling and tone of the market appear much improved and an increased demand is looked for in the near future.

Buffalo. A very general feeling of hopefulness prevails since the election. The general opinion is that improvement may now be expected, gradual but steady. Very little buying has been done although there have been a number of inquiries.

St. Louis. There is every appearance of increased activity in the iron trade, which naturally has its effect on both the producer and consumer. The strong competition of Northern and Eastern furnaces has resulted in the steady downward pressure on the value of the product and these irons are now put on the market at about the same prices that Southern irons brought two years ago. Southern irons are holding their own in the trade and prices to-day rule the same as six months since.

Cincinnati. Those who looked for a quick response in business to the overwhelming declaration of the country in favor of protection to American industries have so far been disappointed, for the iron market thus far is extremely quiet. So far as general conditions of the iron trade are concerned, there is little that is unfavorable. It is remarkable that while the output of pig iron has largely increased and is now crowding close to the figures of 1892, there is nevertheless very little increase of stocks, and apparently consumption is nearly, if not quite, equal to production. Should any considerable increase of demand spring up a rise in prices would be inevitable. The elections have gone far to settle tariff and financial questions, and there are many who think that the new enterprises will very soon begin to come to the front. Nearly all the car works of the country are idle, and the lack of demand from those sources is felt in rolling mills, axle and spring works, car wheel works and many other branches of the trade. The complete absence of the speculative spirit in iron is worthy of remark. Beyond a few inquiries for deliveries running well through next year, there is apparently not the least disposition to buy iron because it is abnormally cheap and future prospects favor higher prices.

Personal.

Ernest Allis, a son of the late Edward P. Allis, of Milwaukee, died last week Friday at the residence of his mother in Milwaukee, aged 36 years. Mr. Allis had been for several years suffering from consumption, and for a long time has not been actively engaged in business.

John M. Evans, who was secretary of the Youngstown (O.) Rolling Mill Co. before it became part of the Union Iron & Steel Co., has been appointed manager of the Sharon Iron Works, of Sharon, Pa. Mr. Evans has been in Chicago for the past two years.

Watkins R. Edwards, formerly of the Edgar Thomson Steel Works at Braddock, has accepted the position of master mechanic at the new Ohio Steel Works at Youngstown, O.

Engineer Hunsicker, the armor plate expert of the Carnegie Steel Co., has arrived at Paris en route to St. Petersburg. His visit to the Russian capital is said to be in connection with an extensive armor plate contract the Carnegie Co. is negotiating with the Russian government.

Andrew Carnegie arrived in Pittsburg Tuesday, Nov. 13, after an absence of more than a year.

CONNELLSVILLE coke operators had 14,024 active ovens, with an estimated production of 139,588 tons in the week ending Nov. 3. This was a decrease of 330 ovens from the week before and 2,234 tons. Shipments were 7,427 cars, a decrease of 55. To Pittsburg and river tipples, 2,342 cars; to points west of Pittsburg, 3,750 cars; to points east of Connellsville, 1,335 cars.

IRON vs. STEEL FOR HEAVY WELDED CHAINS.

An English letter gives the following as to the relative standing of steel and iron for heavy chains, in the opinion of large manufacturers of chains and cables. It will be noted that no opinion is expressed as to the strength of weldless links of steel. The strength of these latter has been well established by experiment as much beyond that of welded iron, saying nothing of their greater reliability:

"I have recently had occasion to interview certain of the leading chain cable makers in the Tipton and Dudley districts as to their views on the suitability of steel for chain and cable making, and in the present state of the steel question they are particularly interesting. That part of the country is the seat of this special class of work and is, therefore, the chief center for the United Kingdom, if not, indeed, for the whole of Europe. The most important firms declare that they have very little faith in chains or cables made from steel, for the reason that they can never depend on sound welding. They have made numerous experiments, but have not as yet come across any steel that will weld with the same amount of security as the best brands of chain iron. During the past 25 years they have experimented upon nearly every kind of steel bar made for chain purposes, and they go so far as to say that a steel chain with welded links can never hope to be classed with anything above a third-rate quality of iron. The firm informed me that the same thing applies to railway and colliery wagon couplings, and illustrate tests made at Lloyd's public testing machine, in which Siemens steel couplings, made especially for testing, broke at a strain of 45 tons, compared with 59½ tons borne by the celebrated Bowling iron (Yorkshire) and 66¾ tons and 67½ tons from iron employed at this firm's works.

"These ironmasters further stated that although the mild steel now put upon the market is much better than a few years back, the expectation that this material would supersede iron for heavy chain manufacture has not been realized. As a striking example of the preference which, even among steelmasters, exists for chains of iron, the firm mentioned that they supply manufacturers of the leading steelmakers in the country with crane chains, and these all specify iron."

German Wages in Iron and Steel Industries.

A press dispatch from Washington gives the following summation of a consular report on wages of iron and steel workers in Germany, with comparison of living cost with that in the United States:

"After an exhaustive examination of the wages paid in the large manufacturing establishments of Luxemburg, which he says are about the same as are paid in other parts of Germany, George H. Murphy, United States vice commercial agent there, transmits to the Department of State a report on the wages paid in the steel and iron industries with a general review of the whole subject of German wages. He finds that generally speaking the average earnings of ordinary workmen amount to less than $200 per annum. Women earn about half as much as men. On the other hand, still speaking generally, the necessaries of life cost as much in Central Europe as they do in America. A workman's expenditures for clothing and rent may possibly be somewhat less here than in America, but in the town of Luxemburg coal costs $7 per ton, eggs 21 cents per dozen, rye flour 3, wheat flour 5, sugar 8, butter 25, beef 19, veal and mutton, 16 to 20, fresh pork 20 and smoked pork 23 cents per pound. Frugality and industry can hardly be expected to accomplish any miracle greater than that of enabling a thrifty workman to keep out of debt."

Iron and Steel Imports in Bond.

A comparative statement of imported iron and steel merchandise remaining in bonded warehouses Sept. 30 this year and last year, is given as follows by the United States Bureau of Statistics, all in gross tons:

	1894.	1893.
Iron ore	29,597	34,689
Pig iron	3,583	1,093
Scrap iron	723	1,488
Bar iron	2,307	2,873
Steel blooms and billets	500	488
Sheets, plates and taggers iron and steel	2,312	5,205
Tin and terne plates	29,583	21,963
Wire rods, iron and steel	2,181	1,887

THE IRON TRADE REVIEW

DEVOTED TO
IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

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THE TIN PLATE BATTLE FAIRLY JOINED.

After a shutdown of nearly two months, unbroken except in the case of one or two gas belt plants which are paying scale wages, the tin plate manufacturers have entered upon another stage of the contest. At the United States Iron & Tin Plate Co.'s plant at Demmler, Pa., and at the mills of Wallace, Banfield & Co., at Irondale, O., a start has been made with non-union men. Guards are on hand and every preparation has been made to operate the mills in spite of the prediction of the Amalgamated Association leaders that skilled men enough cannot be scraped together outside of their organizalion to operate two such important plants. The purpose of the tin plate manufacturers' association to make a square fight with the Amalgamated Association is thus made plain.

The Amalgamated Association has not met squarely the question whether a reduction of $20 a ton in the handicap heretofore put upon imported tin plate does not call for some concession in labor. It has made an unreasonable and indefensible demand to see the books of the home producers and has figured that a profit still exists, even with a 45 per cent cut in the duty. It has assumed to say that this profit, the amount of which it does not know and cannot state, is adequate for all the risks to which capital invested in American tin plate manufacture is subject, and attempts to justify the position that capital must assume all the burden of this radical cut in its earnings. While wages in every other industry have been reduced, it contends that this one, youngest of all, and singled out from all for such a cut in the duty as should be a lesson to home capitalists for all time, shall pay for labor practically the full level of the wages of prosperous times. The position thus taken gives no consideration, moreover, to the vast sums of money invested by American tin plate manufacturers in "experience"—the large outlays which of necessity were made in learning how to make tin plate—an expenditure which pioneers in any industry are bound to make in the experimental period. Nor is there any attempt to gainsay the fact that even under the scale proposed by the manufacturers the rollers will still be able to earn from $7 to $8 a day.

Another factor in the account that has been overlooked in President Garland's comparative statements of market prices of American and Welsh tin plate, is the discrimination in freights against the home manufacturers. This question has long been agitated by the tin plate manufacturers' association, and correspondence was conducted last year with prominent railroad presidents, but thus far wirhout the application of the remedy sought. Moreover, it was well known to the sub-committees at Washington before whom the statements of the tin plate manufacturers were laid, that the importer of tin plates got a much lower rate from New York to interior points than that charged American tin plate manufacturers whose haul to these interior points was only a fraction of the distance from New York. Yet it was dismissed as a matter for the home manufacturers to fight out with the railroads. Doubtless that is where its settlement belongs; but as long as the handicap exists, with efforts to remove it unavailing, this discrimination must be taken into account in every calculation of comparative costs, and it is thus a factor in both tariff and wage considerations.

There seems to exist an arrangement between steamship lines and railroads with which they connect at Atlantic ports by which a through rate is named from Swansea to the interior point to which the plates are consigned, and only the fractional part of this rate is paid from New York, Philadelphia, Baltimore, Newport News or other port, to the destination of the plates, even though they remain in bond for months. It has been a difficult matter to get at the ins and outs of this discrimination in favor of the foreign producer of tin plate; but the injustice of the arrangement is only too palpable. There is some method in a freight schedule that makes a rate of 12½ cents from New York to Buffalo and only 7 cents from New York to Cleveland. The fact that Cleveland is a tin plate manufacturing point seems to be an element in the account. And why it should cost Cleveland tin plate manufacturers 12½c. a hundred to New York is another kink in the line that has not yet been untangled. Why, also, should the rate on tin plate originating at Atlantic ports be 12½c. from Mississippi points to Missouri river points, when tin plate originating at Pittsburg, Cleveland or any other interior point pays a 22c. rate between the two rivers. From South Atlantic ports to New Orleans the remarkably low rate of 3.6c. per 100 lbs. of tin plate is made, and Southwestern lines have made corresponding concessions on shipments from New Orleans to points farther west.

The tin plate industry is verily in the hands of Philistines, from the Washington sub-committees to the rate-makers of railroads that get several tons of freight to haul for every ton of finished product that leaves home tin plate manufactories. And now that the Amalgamated Association has precipitated another contest that means a third hostile influence at home, added to the machinations of our friends the enemy in Wales, the cup of trouble quite overflows. But we look to see the manufacturers make their way out, even at the cost of some hard fighting meantime.

IMPORTS OF IRON AND STEEL.

Statistical comparisons in iron and steel are more significant now that the months in 1894 can be compared with months in 1893 in which the force of the depression was beginning to be felt. The earlier months of the present year could not fairly be set against corresponding months of '93, before the panic had struck. The Treasury Department's statement of iron and steel imports for September shows a smaller volume than for the same month last year. The disparity is particularly noticeable

in pig iron, scrap iron, bar iron and ingots and blooms. In sheet iron, tin plate and wire rods it is less marked. The appended tables give the figures in gross tons for the months of September in both years, and the total for the nine months ending with September, in 1894 and 1893. The nine-months statements show a great falling off in pig iron—about 80 per cent—in scrap, bar iron, rails and ingots, and a distinct decrease, though not so great, in sheet iron, tin plate and wire rods:

	September.		9 mos. ending Sept. 30.	
	1894.	1893.	1894.	1893
Pig iron	1,006	1,681	11,169	51,222
Scrap iron and steel	376	779	1,612	5,840
Bar iron	991	1,396	4,792	12,243
Steel and iron rails	66	14	68	2,888
Cotton ties	.....	100	50	1,460
Hoop, band or scroll iron	.....	61	805	942
Ingots, blooms, etc	973	2,508	5,327	24,327
Sheet iron and steel	2,123	2,283	22,391	32,445
Tin plate	15,607	17,112	152,839	216,427
Wire rods	1,659	1,810	15,735	27,986
	22,801	27,744	214,788	375,780

The iron ore imports in September were 19,776 tons against 19,217 in September, 1893. In the first nine months of this year 112,920 tons of iron ore were brought into the United States, compared with 487,118 tons in the same period last year. It is significant that, with practically the same amount imported in the two Septembers, the valuation put on the iron ore of September this year was $28,618 against $57,932, or twice as much, for that imported in September, 1893. The total value of all iron and steel imports and manufactures thereof in the nine months ending Sept. 30, 1894, was $14,339,328; for the same period last year, $25,088,213.

THE AMERICAN POLICY IN SHIP-BUILDING.

The launching of the first all-American Atlantic liner, the St. Louis, at the Cramp shipyards on Monday, is an event worthy all the significance given it by the participation of the President and cabinet. What the policy thus practically initiated means for American workshops, for American labor and for American commerce can only be measured as the years just ahead bring its actual development. The St. Louis is the largest and most powerful steamship ever built in the Western hemisphere, and with two exceptions the largest and most powerful in the world. She is built on American plans, by American mechanics, of American material, and, it need not be added, she will fly the American flag.

It matters not under what auspices this American policy in shipbuilding was revived. The thing of moment is that the revolution has been wrought and that, too, in less than ten years. In 1885, as President Cramp said in his address of welcome to the President, no rolling mills, forges or foundries capable of making the material required in the construction of the St. Louis could be found on American soil. The policy of naval construction adopted in 1885, though repeatedly urged and defeated in previous years, soon wrought a change. Twenty-six ships, having an aggregate displacement of 93,166 tons and a total indicated horse power of 166,681 were recommended in the first Cleveland administration. In the four years following 14 ships, of 73,399 tons and 105,245 indicated horse power were authorized. The result of this vigorous campaign of navy building has been the establishment of American shipbuilding on a footing that guarantees the restoration of the American flag to a place on the high seas. What this means to other industries is indicated on one paragraph of President Cramp's address:

Not only did your policy promote domestic shipbuilding, but it concurrently developed cognate and contributory industries with equal effect. For the first three ships built here, the Baltimore, Yorktown and Vesuvius, we had to import the shafts, because they could not be forged in this country. Nine years from that time, an American forge at Bethlehem makes the shafts for the colossal ship launched to-day without seriously taxing its power.

According to one school of economists, the contracts for these vessels which have been built in Eastern shipyards the past ten years should have gone abroad because there were not the facilities at home to build them. And because Clyde shipyards were turning out vessels at a lower price than was possible at American yards, was reason enough in the theory of this school for saying that the making of vessels to carry a share of the world's commerce was not a "natural" or "native" industry. The folly of providing foundries and forges with machinery for turning out shafts and other massive parts of the equipment of great liners, when there was no assurance of a dollar's worth of work to employ such machinery, is patent to the most bigoted belittler of American achievement. And yet the contention has always been that this country must keep hands off of industries established abroad by just such encouragement as was long refused when suggested for the United States. American capital and American engineers were bidden to first learn to swim and then permission would be granted to go into the water.

But respect has been given to better counsel and a better day has come at last. American tin plate and American ocean liners are the product of a patriotic policy whose wisdom is having demonstrations more convincing than all the theorizing of text-book economists.

THE movementfor the extension of trade relations beween the United States and the countries to the South is gaining headway. The committee appointed by the Cincinnati Manufacturers' Association to arrange for a manufacturers' conference in that city, has issued a call for such a meeting on Jan. 22, 1895. The purposes are thus set forth:

First—The advocacy of carefully considered legislation, to encourage manufacturing industries of all classes throughout the country.

Second—The discussion of ways and means whereby trade relations between the United States and foreign countries may be developed and extended.

Third—The establishment in South American capitals and other desirable points of permanent expositions for the display of American products.

Fourth—Such other topics as may be agreed upon.

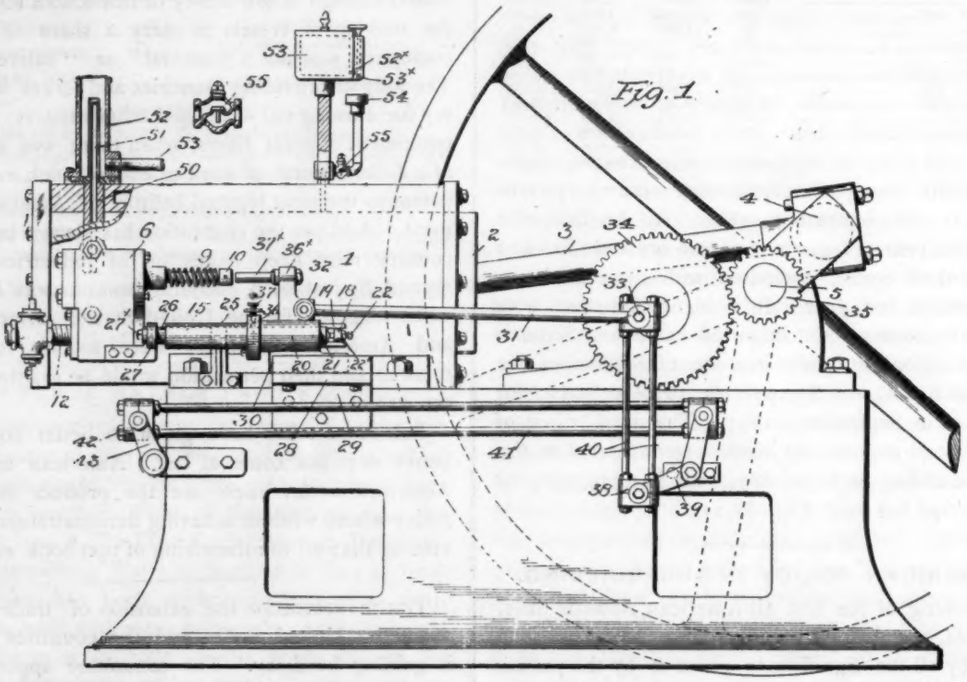
This convention is to be non-political, non-partisan and non-sectional. The call is not only to associations of manufacturers, but to individual manufacturers who want to perfect an organization to campaign for a larger trade in Mexico and Central and South America. President Diaz has heartily endorsed the proposal to have an exposition in Mexico in 1896 or the year following. On this subject *Dixie*, which originated this movement, says in its current issue:

We are still convinced that the first of these expositions should be held in Mexico. President Diaz has expressed a sincere interest in the matter in several communications addressed to the editor of *Dixie*. He recognizes the benefit that the Mexicans must derive from an exposition of the character suggested, and tells his desire to strengthen the industrial relations of the two countries "already so closely bound by ties of friendship." After the exposition in Mexico, the movement should extend to the South American republics. Two of these enterprising states have already begun the work. Although there is nothing international in the character of their contemplated expositions, we believe it would take but the suggestion to make them so.

THE McGEORGE GAS ENGINE.

A new gas and gasoline engine, designed by James McGeorge, of Cleveland, is shown in section and prospective in the accompanying cuts. Fig. 1 is a side elevation of the engine with minor parts in section. Fig. 2 is a detailed sectional view of the valve box and parts of the governor in section. Fig. 3 is a detail side view of the governor box and parts of the governor in section. Fig. 4. shows the complete engine in perspective.

The cylinder is water jacketed. The piston is of the trunk form with connecting rod pivoted at one end directly to the



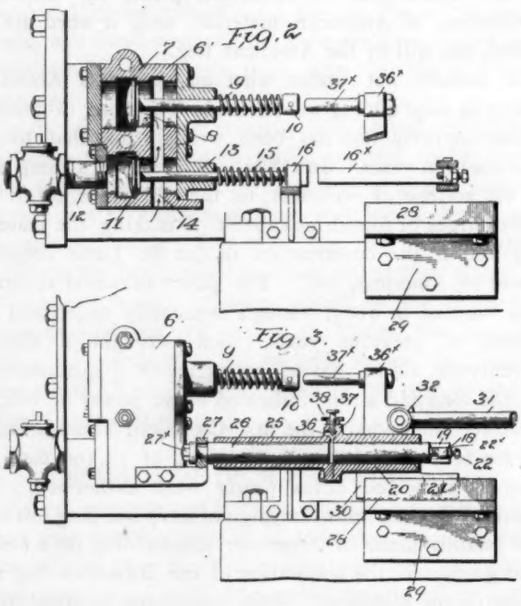
piston, and at the other to a center crank. The crank shaft bearings are now cast solid with the bed instead of bolted on as shown in the original drawings. The top faces of the bearings are inclined towards the cylinder at an angle of 30 degrees, so that the thrust comes on the solid part of the bearing instead of on the cap and cap bolts. The motions for opening air, gas and exhaust valves are all taken from the pin 33 on gear 34. Gear 34 is driven from pinion 35. The ratio of these gears is 2 to 1, so that each valve is opened once in two revolutions of the crank shaft.

The governor is pneumatic in character and includes a movable index finger adapted to operate the gas valve regularly when the engine is running evenly and the finger is in normal position; an index piston to operate the index finger and throw it out of line with the stem of the gas valve when the engine exceeds its required speed, in order thus to miss an explosion, and a governor cylinder and piston in order to operate the index piston when the pressure exceeds a predetermined degree due to increased speed of the engine, and consequently of the governor cylinder. It includes also an adjustable valve controlling an open air port leading from the space between the two pistons, by which the escape of air may be regulated to control the speed of the engine.

The index piston will move under the slightest increased pressure in the governor cylinder. This sensitiveness is increased by the inertia of the index piston which tends to lag behind. The movement of the index piston is multiplied by a bell crank lever to effect a larger movement at the point of contact with the gas valve stem. There are only three working parts in the governor arrangement; that is, two solid pistons without rings, one having a movement of 3 in., the other of 1-16 in., and a bell crank having a very slight movement on its pivot; so that although the movement is so sensitive to change of speed in the engine, there are no delicate parts to get out of order.

The inventor has built a large number of these engines; the most of them for electric lighting in towns and stores. One of these engines, located in a Cleveland store, is running 300 incandescent and three arc lamps. The engine has two cylinders each working alternately thus getting an impulse every revolution. The incandescent lights are all located in one room of comparatively small size, and the walls above the height of the counter are arranged in one continuous mirror all around the room giving a perfect blaze of light. This is, as many readers of this description are aware, an extreme test of the governing of a gas engine or even of a steam engine, yet there is no flicker in the lights. The main switch can be pulled out, throwing the load entirely off the engine, without increase in speed of the engine, and conversely the full load can be suddenly thrown on, the governor acting on the gas valve instantly and keeping the engine up to speed.

A number of engines of the same design are running in other towns for street lighting as well as for stores, offices, etc., using both natural gas, gasoline and coal gas. Besides engines with double cylinders, the inventor has placed a number of these engines with single cylinder which are now



in successful operation for a variety of purposes, such as running factories, pumps, blacksmith machinery, grist mills, etc.

Fig. 2 shows the arrangement of air and gas valves, and Fig. 3 shows parts of the governor in section. The stop cock

opposite the lower valve admits gas. When the piston is on its suction stroke, the gas valve is opened by the index finger 16x of the governor, and is drawn into the air passage along with the air, with which it mixes, and the mixture passes through the upper valve into the cylinder. The upper valve is opened (in the larger sizes) positively by the pushing finger 37x carried by the governor, a strong spring securely closing the valve against leakage. On the return stroke the mixture is compressed to 45 lbs. pressure, which forces the mixture up into a hot tube and explodes it at the commencement of the next outer stroke. On the next return stroke the exhaust valve is opened allowing the burnt products to escape and the cycle of operation is immediately repeated unless the engine is above the speed however slightly in which case the index finger of the governor moves to one side and misses the gas valve stem, and so the engine misses an impulse for that cycle. Some of these engines are fitted up with the electric spark for igniting the explosive mixtures. Both methods are operating successfully.

The cylinder lubricator has a check valve as shown in Fig. 1. This prevents the blowing out of the oil and permits placing the lubricator nearer to the explosion end of the cylinder than is usual in a gas engine, thus freely oiling the explosion end of the piston (where the piston rings are) and preventing the oil from working unused at the open end of the cylinder. The lubricator is also a sight feed, the oil dropping from opening 53 to cup 54 and is regulated by the milled head shown on top.

It will be noticed in Fig. 1 that both rods for opening inlet and exhaust valves are operated from one pin. This motion is made possible by the use of the bell crank lever 39. When one rod is at the end of its stroke the other is about the middle, thus bringing each movement at the proper time. The exhaust begins to open a little before the piston reaches the end of its stroke. This exhaust lead is effected by moving the bracket on which the bell crank lever is pivoted, a little nearer the cylinder end of the bed.

The patentee, James McGeorge, 25 Luther St., Cleveland, will give further information on application. A company is now forming, for the manufacture of these engines.

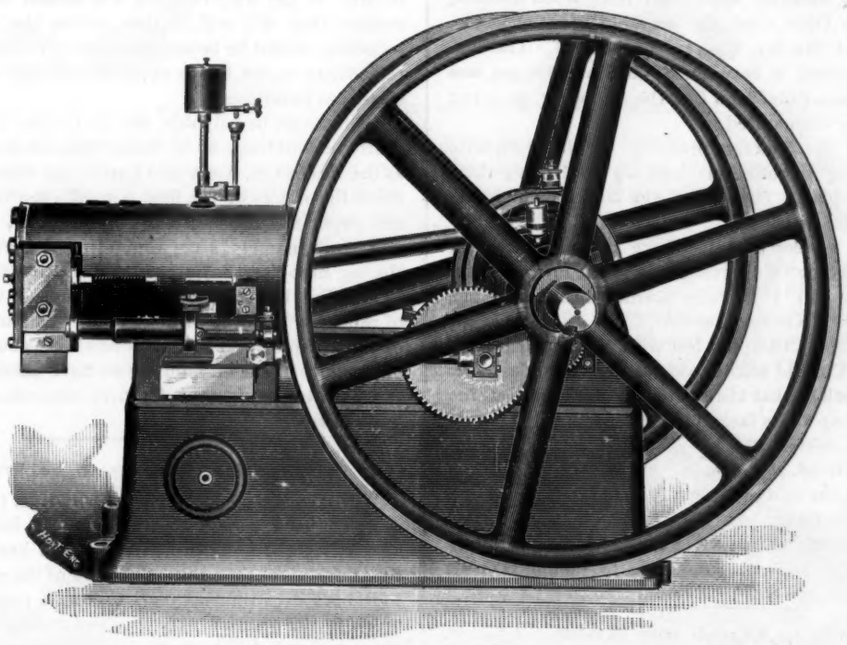


FIG. 4—THE McGEORGE GAS ENGINE.

The Machinery Situation.

The unequal distribution of business in the machinery trade is one of the more peculiar phases of the present prevailing dullness. In some instances the amount of trade done is not only up to normal conditions, but so much beyond them, as to compel extra hours and taxing to the full productive capacity. In others these conditions are reversed and reports markedly discouraging. The causes of both are of course in logical relation with the general situation. Thus we find that business largely dependent on railroads is directly affected by the decline in railway business or profits. On the other hand, where machine tool building is of an advanced and special nature, increasing production in less time and at less cost than the older methods or machines, the depression that depreciates the one increases the demand for the other. This is an invariable rule, not only in conditions of generally depressed trade, but also in those of severe competition. The machinery business is as susceptible to these influences as any other class of trade or manufacture. It has to keep in line with public needs to secure its demand. Machines that have the reputation or make the claim of saving time and money are as close in touch with hard times as with those of better.

Again, in such rapidly developing industries as those connected with electrical enterprise, the volume of trade is increasing and encouraging. Prices may suffer, but demand goes on, and these conditions will probably continue so long as productive capacity is below the standard of requirement. Outside, however, of the special lines indicated or closely related, there can be no question as to a temporary stagnancy. The word temporary covers the situation in these cases. The railroad demand, for instance, cannot for long withdraw from the market. Financial and crop conditions, while obviously important factors in the transportation industries, cannot reverse the fact that machinery wears out, and its replacement even under the most rigid economies is but a question of time. This holds good in every other phase of service, from a corn sheller to a threshing machine, and from a sewing machine to the equipments of a mine. It is not only reasonable to assume, but it is absolutely certain that in the revival of general business the machinery trade will have its full share and when not behind the times in its methods will increase its activities.—[Age of Steel.

Change in the Finishers' Scale.

Youngstown, O., iron manufacturers held a conference Nov. 12 with the officers of the Finishers' Union, to discuss changes proposed by the manufacturers in the scale now in force. There is no time limit to the scale, but amendments may be made on proper notice by either side. The changes asked for in the present instance were a 10 per cent. reduction on rolling and 5 per cent reduction on heating hoop and skelp iron, so that these sections might conform to the rates granted by the Amalgamated Association. The justice of the manufacturers' claim that they should be put on a par with competitors in respect to these items was conceded by the finishers' committee and the changes asked for were conceded.

A NUMBER of the rail straighteners who struck at Braddock, on account of an increase in work without added pay, have accepted positions in the Ohio Steel Works at Youngstown.

LAKE SUPERIOR IRON MINES.

The sale of the Chapin mine to M. A. Hanna & Co., was confirmed last week by the court at Iron Mountain, Mich., to which Trustee Flannigan reported. The purchasers and C. A. Chapin, of Niles, Mich., the fee-owner, and James McNaughton, of Iron Mountain, met at the offices of M. A. Hanna & Co., in Cleveland on Monday and Tuesday of this week and perfected the organization of the Chapin Mining Co. The old company, which had the same name, was incorporated in Wisconsin; the new company incorporates under Michigan laws. The capital is $500,000 in 20,000 shares of $25 each. The Michigan office will be at Iron Mountain; the general offices will be in the Perry-Payne Bldg., Cleveland. The directors of the company are as follows: M. A. Hanna, president; L. C. Hanna, vice president and treasurer; A. M. Robbins, secretary; James McNaughton, general manager; C. C. Bolton, C. A. Chapin. The mine has been shut down for a week of late for repairs to the hydraulic plant. It is now working and will continue in operation through the winter with the present force of from 500 to 600 men.

Ore shipments from Ashland last week were 37,000 tons and from Duluth 50,000 tons, which with Escanaba's quota and the scattering cargoes from Two Harbors and Marquette, indicates that the November record will run upwards of 200,000 tons.

The personal property of the Germania Iron Mining Co. consisting of boilers, hoisting apparatus, coal, wood timbers, etc., attached by the Ohio Coal Co. on a judgment of $3,500, was sold last week at Hurley, Wis., by the sheriff. The machinery, which is valued at between $15,000 and $20,999, was bid in by the Northern Chief Iron Co., the fee owner, so as not to have the property dismantled.

The managers of the Swanzy property on the Marquette range are conducting negotiations looking to leasing their mine on the royalty plan. The sale of the land on which the mine is located is also discussed.

The Aragon will employ a winter force of about 250 men. There has been considerable speculation as to the future ownership of the Aragon and it is freely predicted that a change will probably occur.—[Norway Current.

News was received in Champion last week to the effect that the Champion Iron Co. had sold 10,000 tons of first-class ore. Not having that much of that kind of ore in stock, two of the shafts were started up and a large force of men put at work. —[Champion, Mich., letter.

A Duluth dispatch of Nov. 9 says: "The sheriff has just made his returns in the suit of Alfred Merritt against John D. Rockefeller and F. L. Gates. He has attached 7,001 shares of Minnesota Iron Co. stock belonging to Rockefeller, worth $50,-050. Rockefeller will now be compelled to defend the suit here."

Honors to an English Iron Master.

The banquet to E. Windsor Richards, president of the Iron and Steel Institute, given at Sherry's, New York, on the evening of Nov. 8 was in all respects a successful affair. Upwards of 100 representative engineers and iron and steel makers were present, with Hon. Abram S. Hewitt as chairman and John Fritz, president of the American Institute of Mining Engineers; W. P. Craighill, president of the American Society of Civil Engineers; Eckley B. Coxe, president of the American Society of Mechanical Engineers, and B. F. Jones, president of the Iron and Steel Association, as honorary chairmen. The feature of the occasion was the presentation by Mr. Richards to John Fritz, of the Bessemer medal awarded the latter at a meeting of the Iron and Steel Institute last year. Speeches were made by a number of the best known attendants, all containing the most cordial expressions for the guest of the evening and those he represented. Mr. Richards sailed for home Nov. 10.

HINKLE Furnace, Ashland, Wis., made a good record in October, averaging over 800 tons of charcoal iron a week, the total for the month being 3,574 tons.

ESTIMATES on the amount of Mesabi ores that will be marketed next year range all the way from 2,000,000 tons up to 4,000,000 tons. The former estimate is based on the supposition that only 25 per cent Mesabi will be used in general furnace practice.

DO SKY-SCRAPERS PAY?

Every large city is now facing the question raised by the Boston *Commercial Bulletin* in the following editorial. There has been an unusual investment of money in tall buildings in the last 18 months, in the belief that such an investment offered greater security than industrial stocks and bonds. The next few years may show that while security was gained, it has been at the loss of immediate return:

"During the past decade, many high office buildings have been erected in Boston, and the question naturally arises: Are they paying? As far as can be learned, these new buildings have proved paying investments and are, in general, entirely occupied. Now, even allowing that the city is rapidly growing, there is, of course, a limit to the demand, so to speak, for office buildings, and there are certain indications now at hand, which show that this limit has been nearly, if not actually, reached for the time. Every new building which goes up accommodating from 500 to 700 occupants, must naturally draw the bulk of its tenants from some other building.

"Real estate brokers say that new office buildings, like new houses, are attractive to people, and they will leave offices in another building, with which they are satisfied, to move into a new structure. The result has been, as might have been expected, that the tendency of rents in the less desirable buildings is downwards. Now, the great question is regarding the future. If the owners of the last named buildings find it necessary, they will still further reduce the rents, for a further reduction would be better than empty rooms, and such further reductions cannot fail to exert an influence on the rents of all classes of buildings.

"This must be palpable, for the further the rents of the less desirable buildings slide below those of such office buildings as the Exchange, Ames and Carter, the more attractive will become the offices of the first named, even to people who need not especially economize. Consequently, there can be only one result, namely, a corresponding reduction in the rents of the big first-class buildings. To be sure, the city is constantly growing, but it is good opinion that for the sake of stability of rents the building of huge office structures should not go on too rapidly. Their erection, of course, improves the appearance of the city, but as we have before mentioned, there is a limit to the demand for first class offices on the present basis of rents."

Preaching Worthy to be Practiced.

With the elections of November, 1894, the business men of America have reason to feel that the last fictitious barrier against a return to prosperous times has been swept away. Standing upon the vantage ground of the present, we can well look back over the two years that have passed, with a renewed belief in the stamina, elasticity and courage of our country, for there certainly has been during that period one difficulty after another to surmount. We have encountered the financial disasters of the world, the demonetization of silver in India, the Baring failures, the agitation over the repeal of the silver question, and that greater agitation over the tariff question, which for months enabled Congress to hold the business of the country in its grip without possibility of escape, and until that laborious and slow-moving body should be disposed to come to a vote and allow the country an opportunity for breath. Congress had hardly adjourned before the agitation over the elections commenced. This was hardly necessary, but it was hard to persuade the country at large of that fact. * * *

Out of it all, however, we must hold to the consoling fact that no one except pessimists of an advanced degree, can evoke from the affairs of the future any new phantom to stand in the way of business prosperity. The troubles in the Old World, so long as they do not touch us directly, are merely an incentive and an opportunity for a further development of our resources. It seems the part of practical wisdom for every man, to settle down to the conviction that upon him rests a part of the responsibility, and that it is his duty as well as his privilege, to do everything in his power to set the wheels of industry revolving with renewed activity. By so doing, and by casting the fears of the past away with the days that have gone with them, he will be doing the part of a patriot and at the same time working for his own personal success.—[Hardware.

THE OSTER PATENT ADJUSTABLE DIE STOCK.

The die stock recently brought out by the Oster Mfg. Co., of Cleveland, O., for whom the Manufacturers' Tool Supply Co., 17 South Canal St., Chicago, are Western agents, has several features which will recommend it. It is very easy to operate, has small weight, and great strength, is made of the best material, and has the finest and most practical finish that can be obtained. It is warranted to be one of the best hand tools for threading and cutting off pipe. It is simple in construction, and is easy to operate. Description of the tool and instructions as to operating it will be sent on application addressed either to the office of the makers or their agents.

THE OSTER PATENT ADJUSTABLE DIE STOCK.

THE OSTER DIE STOCK AS ARRANGED FOR USE AS A CUTTING TOOL.

Gas Engines of High Power.

Mr. J. H. Killey of Hamilton, Ont., writes of gas engines in the *Canadian Engineer*, as follows: "Rivalry with steam power in an economical sense is now the order of the day among advanced mechanicians. Perfectly successful gas engines up to 600 horse power are now in operation, running with the steadiness and the regularity of the steam engine, not taking more than one pound of inferior coal per horse power per hour, while some builders claim that they can build them to run with ¾ pound. A gas works in the States has a 300 horse power gas engine running a dynamo, enabling them to supply electric lights in addition to gas light at a net cost far below that of the most economical steam engines and boilers.

A European engineering firm has contracted to build a gas engine of 1,000 horse power, which it is expected will rnn with ½ pound of coal per horse power per hour. Tangyes, of Birmingham, Eng., advertises gas engines of 40 horse power, which are guaranteed to work with less than one pound of coal per horse power per hour—a remarkable result for so small an amount of power. If gas engines can be successfully constructed and set to work of 1,000 horse power, why not of 2,000 or 3,000 horse power, if wanted? Dowson gas can be manufactured for 20 to 25 cents per 1,000 cubic feet. This gas is largely used in gas engines of large power; this is about one half tne cost of the fuel for the most economical steam engines."

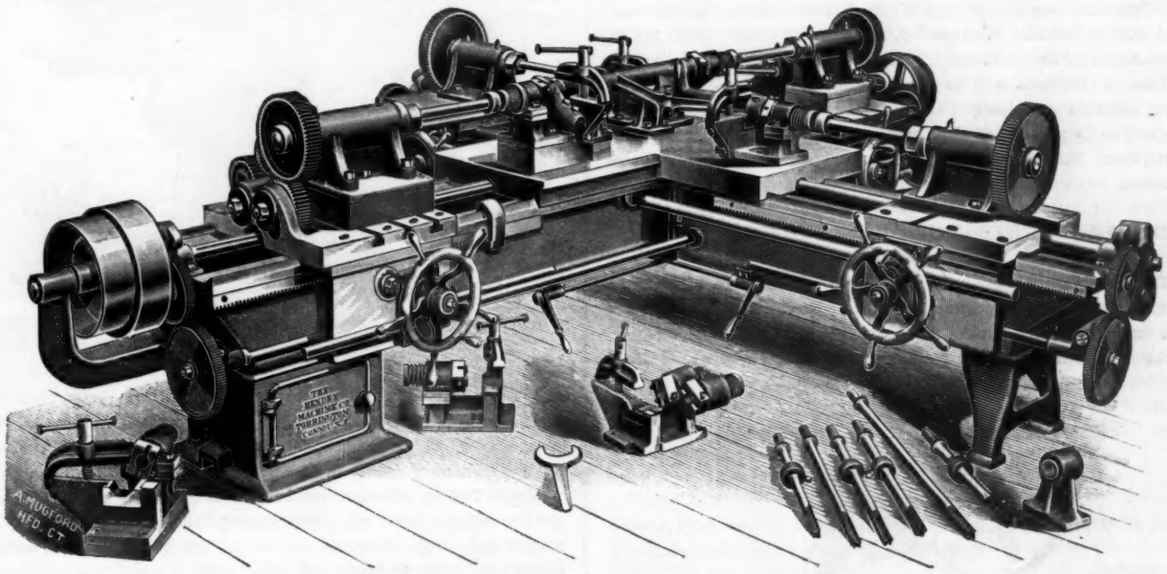
BORING, DRILLING AND FACING MACHINE.

The accompanying illustration shows a machine originally designed for harvesting machinery manufacturers for boring and facing bearings in the frame of a mower, six bearings being finished simultaneously. The machine was so built, however, as to adapt it to a considerable range of work in which holes are to be bored in line or at right angles to one another, thus adapting it to different styles of mower frames, and to other work as well.

The bed is in the form of a cross, and carries upon each of its four arms a carriage. All these carriages can be moved by hand the same as a lathe carriage, and have also automatic feeds. At the center of the bed or at the intersection of the four arms of the cross, the work is secured upon a platen, to which it is lifted preferably by an air or other hoist, though when not too heavy to be readily handled it can be put in place and removed by hand. Two of the spindles are adjustable laterally, and all of them can readily be made so if circumstances require it.

The plan adopted in this instance was to arrange for clamping the work uniformly and then place around it doweled brackets which support bushings and facing tools; the latter being driven by clutch collars fastened to the bars.

The principal dimensions of the machine are as follows: Extreme length of bed over all, 16 feet nine inches; length of bed the shorter way, or of the "side beds," 12 feet nine inches; feed of main heads 25 inches; feed of side heads 18 inches. There are two tables for holding work, one of these being two feet by four feet six inches, the other one foot nine inches by two feet. It can be geared to suitable speeds for holes varying from ½ inch to 2½ inches and to face four inches diameter. The weight is about 9,000 pounds. The Hendey Machine Co., Torrington, Conn., are the makers.



BORING, DRILLING AND FACING MACHINE.

BROWN & Co., of Pittsburg, have voluntarily raised the wages of puddlers at their Wayne Iron Works to $4 40. This is in pursuance of a promise made last winter. The Amalgamated rate is $4. Some non-union mills at Pittsburg are paying $3.60, and in one case as low as $3.25 is paid.

MACHINE SHOP AND FOUNDRY.

ELECTRICALLY DRIVEN MACHINERY.

The question of power transmission by electricity, so much discussed of late, is made more interesting to iron and steel manufacturers by the announcement that a mill for rolling structural shapes by electricity is soon to be built. Electrical power so far has been used mainly in shops containing many pieces of machinery but none requiring any great amount of power. A Chicago company operating an establishment in Germany claims to have done away with shafting entirely, made a decided improvement in the sanitary condition of the shop, and at the same time a saving of about 40 per cent in the motive power required. A motor is applied to each machine, saving quite a waste, according to this statement. It is claimed that electricity can be thus very profitably applied to the running of special tools in machine shops, and that it could be used to a better advantage in cases where compressed air is now employed.

On the other hand, there are some decided disadvantages in the use of electrical power in large manufacturing establishments. The motor is too complicated and delicate. As one writer in discussing the electric motor has said, it has been until very lately constructed more with a view of being run in a laboratory than in a manufacturing shop. If there is any place where such a piece of machinery would not do, that place is a rolling mill. In the handling of iron and steel the machinery has to stand rough usage. The advocates of electrical power claim that this objection to the motor is being rapidly overcome and that before long it will be made equal to the demands of any class of work. At all events, the effort to operate a rolling mill by the mysterious force will be watched with great interest.—[American Manufacturer.

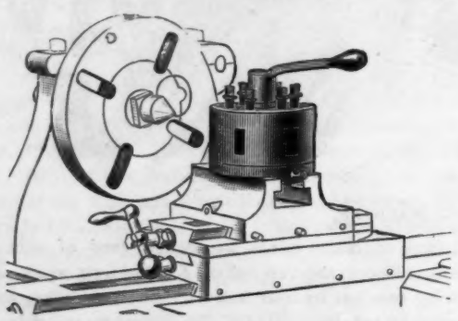
WESTERN FOUNDRYMEN'S ASSOCIATION.

The secretary has issued the following notice of the November meeting of the W. F. A.:

"The next meeting of the Western Foundrymen's Association will be held on Wednesday, Nov. 21, 1894, at 7:30 P. M., at the Great Northern Hotel, Chicago. The report of the committee on test bars will be read and discussed. All Foundrymen, whether members of the Association or not, are cordially invited to be present at this meeting, and to take part in the discusion. Kindly advise the Secretary whether you will be present. "B. M. GARDNER, Secretary."

HOLMES TURRET TOOL HOLDER FOR LATHES.

The turret tool post illustrated herewith is to be used in connection with an ordinary engine lathe, as a substitute for the expensive turret lathe, thus providing, practically, a turret lathe at a nominal expense. It is placed upon the slide rest

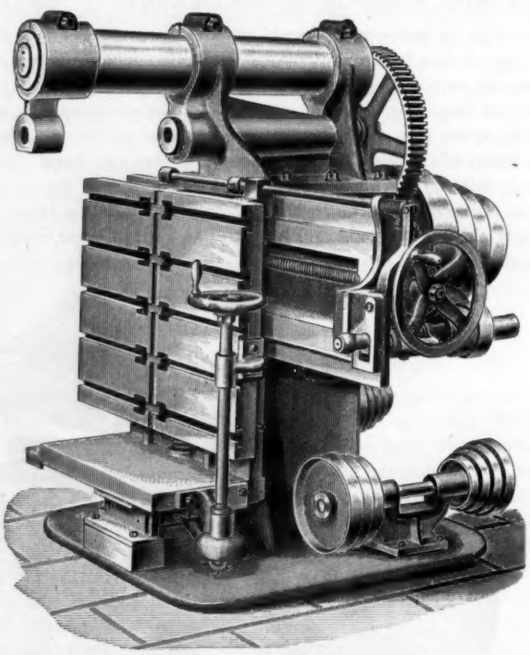


HOLMES TURRET TOOL HOLDER FOR LATHES

of the carriage in place of the tool post, and can be adjusted readily for use as quickly as a tool can be changed in a tool post, and when adjusted, any of the tools contained in the turret can be brought into position instantly. It will readily be seen that users of this tool are not confined to center work; it being placed upon the tool rest of the carriage, they have full control over it, and can shape, cut off, or cut inside or outside threads of any kind or pitch, etc. All lathe men will appreciate this advantage. The illustration shows that the turret has six tool slots with set screws, in which tools can be adjusted as in an ordinary tool post, and in which the regular lathe tools can be used. Jaws can be used in the slots for holding round shank tools. A bolt passes from the slot in the tool up through the center of the base and spindle, having a large washer and nut upon its upper end, which, being screwed down, holds the entire tool firmly in place. For very heavy work the top lever is brought over the nut for holding the tool firm. A projection upon the bottom of the base fits into the slot in the tool rest to prevent turning when the turret is revolved. The turret when operating is held rigidly in position upon the base by a bolt, (operated by a spring latch shown) which passes through the base and into the sockets, in the bottom of the turret. Sockets may be bored through the tool slots for center tools, if desired. One or two of these turrets filled with tools, kept at hand in the shop, will soon pay for themselves in the saving of time, even if there is no special work on hand requiring a turret. All the tools are guaranteed. Price lists and further information will be sent upon application to the manufacturers, W. H. Holmes & Co., 189 LaSalle St., Chicago.

STANDARD MILLING MACHINE.

The standard milling machine designed and built by Beaman & Smith of Providence, R. I., is in the nature of a special machine, since it is to do such milling as cannot to advantage be done on a regular market tool. There are many quite heavy pieces which are to have light milling cuts, such



STANDARD MILLING MACHINE.

as milling of ports in steam cylinders, cuts on the ends of pieces 24 to 30 inches long, etc., many pieces difficult to hold on an ordinary table miller. This machine supplies such wants. The spindle is three inches in diameter, and is driven with a 20-inch gear, meshing into a 5-inch pinion attached to a quill carrying a four section cone for 3½ inch belt on 11-inch, 13½-inch, 16-inch and 18½-inch section diameters respectively. The ratio of the cone to the spindle is four to one. The spindle head has 1-inch lateral adjustment. The overhanging arm is six inches in diameter, forming a stiff support when milling with a gang of cutters on the arbor. The arm can be removed if desired. The table or platen face is vertical, 32 inches long and 25 high, has T-slots, as shown, with tongue grooves running crosswise, besides one central vertical groove for locating and fastening fixture or work. The cross slide or sadle is guided by V-slide on front of the standard, and also rests against the front of the standard at the lowest point beside an adjustable slide on the extreme front of the base, all of which allows very heavy pieces to be fastened to the platen without altering the alignment of the slides in the least. The vertical adjustment is six inches, and

is operated by a hand wheel on a vertical shaft. The cross feed is 20 inches by hand or power and has automatic stop. The machine is furnished with countershaft, wrenches, etc., and weighs complete 5,500 pounds.

SHOP AND FOUNDRY NOTES.

In an article on the engineering industries of Manchester, Eng., the London *Engineering Review* gives prominence to a view of the foundry at the Crossley Gas Engine Works. It is one of the largest in Great Britain, being over 400 feet in length and having every equipment for the advantageous handling of material and product. It is served by two large gas engines, one of them, capable of indicating about 85 h. p., driving a large blower which supplies the blast for the cupalos, besides furnishing power for the cranes that traverse the foundry in every direction. Through the middle of the great building run heavy steel supports surmounted by girders, on which rest the ends of the roof trusses, each side of the shop having its own truss roof. Plenty of light is furnished by broad skylights running the length of the foundry on either side the crest of each roof.

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It is of great importance to so proportion a pattern that the metal will be distributed so as to meet all the strains likely to be caused by the machine of which the casting is to be a part. In addition to this, it must be remembered that patterns constructed solely in accordance with that idea would, in some cases, be of no use whatever, as they could not be cast from and perfect castings secured. This means that the internal strains of a mass of cooling iron must be considered and provision made for meeting and absorbing such strains. It is then sometimes necessary to put in much more iron than strength requires, in order to secure a casting that will not crack in cooling.

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When finishing the junction between two parts of a pattern which join each other at a considerable angle, some kind of a fillet should be put into the apex of the angle. An old pattern maker was accustomed to illustrate the use of fillet by holding up his hand with the fingers spread apart, and pointing to the delicate curve which joined each finger to the other, would say: "There's a fillet pattern for you. Always make fillets join the surfaces just like that, and the work will always look well and never crack." Three kinds of fillets are in general use, the wood, the leather and the wax. In large work, the wood fillet, glued strongly in place and worked out to a nice curve, answers the purpose. On rough work, the leather fillet can be put quickly into place, and by soaking in water, can be readily bent around curves and into quite short corners. It is glued and nailed in place, and can be used on the better classes of work by soaking or brushing over with a solution of nut galls. Only the glue surface need be treated, and the treatment is solely to make the glue take better hold of the leather. The wax fillet is especially adapted to fine work where corners of one-eighth, one-quarter, and three-eighths of an inch diameter are to be put in. A tool must be provided for each size. Pieces of plain round steel, squared off at the end, and well polished will answer well. One end of each piece should be left straight, the other end ought to be bent to a rather short angle, say to a radius equal to the diameter of the tool. This will enable corners to be put into close quarters, also in circular sweeps, etc. To apply a wax fillet, heat a piece of steel kept for that purpose and with it melt the wax into the corner, putting in a sufficient quantity to make the fillet, an excess will do no harm; then form with the tool of right diameter and remove the extra wax with a chisel.

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The makers of steel castings and forgings in England find it profitable, or at least expedient, to finish, or partially finish, their work so they may detect any want or imperfection before the pieces leave the works. Messrs. William Jessop & Sons, of Sheffield, recently added to their equipment a number of powerful machine tools large enough to prepare marine cranks and other work of all kinds. As this preliminary work costs no more when done by the steel makers, the weight reduced, the "chips" left at the works, and the quality of the work assured, it seems a very judicious and economical method, but must add a great deal to the investment. In the case of Messrs. Jessop & Sons some new tools recently added must have cost not less than $5,000 each, but the firm's enormous business permits whatever will insure excellence.—[Industry.

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Some one has been at the trouble, and it is a good deal, says *Industry*, to add to engine lathes a barrow load of details to attain automatically an uniform cutting speed. "It is an ideal condition, but 'costs more than it comes to.' At least ten years ago, perhaps 20 years ago, a few makers arranged the first wheel, on what is called the poppet spindle, to move sidewise and gear with either the cone pulleys or the main spindle. This was a most useful feature, costing two or three dollars, but is found on but few lathes. About the same time Harvey Bros., of Glasgow, introduced a second pair of wheels in the back gearing of common lathes, another feature of much practical value, but has not spread much, although it gave complete control of power and saved the belts. Even sooner F. B. Miles, of Bement, Miles & Co., Philadelphia, made his cone pulleys parallel, and in such a manner as not to injure the belts, a simple and perfect invention, but no one uses it, or at least few, so we must conclude that the scheme at first mentioned will find slow favor among tool makers."

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Generally speaking, in the instance of machines, the one with which the most work can be produced in a given time is the cheapest notwithstanding the cost. But this does not always follow. Suppose there is no use for such a tool for more than a month in the year the case requires further consideration. You do not need a horse that can do his mile in two minutes to draw a plow. A cheaper animal would probably be better in every way.—[American Machinist.

Fort Payne, Ala., as It Is To-day.

Ft. Payne, Ala., with its one blast furnace ready to run and another half-built and likely to stay so, is thus spoken of by a correspondent of the Cincinnati *Commercial Gazette:*

"The writer was painfully impressed by the desolate appearance the little town presented recently. It was night when the visitor arrived, and the blackness of old Lookout, grim and dark against the horizon, but emphasized the painful contrast to the appearance of the gay little city four years ago. It is a tragic tale—the rise and fall of this little town, carrying with it desolation and despair into so many once happy homes and hearts in New England. The beautiful homes, costing so many thousands of dollars, laid out with such loving pride, are owned now by the natives of the place—people who had lived in 'cabins' before the boom, whose 'farms' had been so eagerly bargained for, and who could afterward use the money thus given them to buy for a mere song the lovely homes built there. Those who do not buy calmly select a house—anywhere—and proceed to dwell therein. No rent can be collected from them, for they once more rule the town so wonderfully improved for them by the 'Yankees.'

"All the industries are lying idle, many of them dismantled by the men having charge of them for the past three years, selling the fine machinery to pay their own salaries. All is waiting for a purchaser. The whole town, costing more than $5,000,000, could be bought to-day for $50,000 or less. But who will buy?"

THE show of distinguished beauty, transfixed by famous artists, now taking place at the Academy of Fine Arts in New York, is anticipated by the *Cosmopolitan* in its November issue, in an article by Wm. A. Coffin, with illustrations of some of the more beautiful faces. Survivors of the war and their children will find intense interest in "The Story of a Thousand," a personal narrative begun in this number by Albion W. Tourgee, who tells in a graphic way, of a regiment which saw fierce service—of its organization, its marches, its sports, and its death-roll.

AFTER a shut down of two months, operations have been resumed at the Duquesne (Pa.) Tube Works, giving employment to 400 men.

OVER 100 Pittsburg puddlers have left for the South to take positions in Alabama mills. Iron manufacturers there are tired of depending entirely upon negro labor.

NEW USES OF STRUCTURAL STEEL.

Jeremiah Head, who recently visited the United States, presented a paper on the above subject at the recent conference in Glasgow, of the British Iron Trade Association, of which he is treasurer. We reprint it practically in full:

It is doubtful whether we have in this country done as much as we might have done to stimulate the demand for iron and steel in directions other than railways, shipbuilding, and tin plates, which are three of our chief channels of consumption. It is, at any rate, certain that on the continent of Europe and in the United States of America a great deal more has been attempted and achieved than has been done here in the way of applying iron and steel to other and more general purposes, in substitution more especially for timber, bricks, and stone. The most remarkable development in this direction has taken place in the application of steel to structural purposes, and especially in public and private buildings. The United States have led the way. The initial impulse was received from the modern tendency to carry structures in central thoroughfares to great heights, and from the recognition that additional safety, convenience, and economy would be involved by substituting steel for timber and brick work in such cases. * * *

The full extent of this movement is difficult to estimate, but it may be judged of to a large extent by the extensive demand which now prevails for structural steel throughout the United States. A majority of the large iron and steel companies have gone into the manufacture, and many of them are giving more attention to structural iron and steel than to any other branch. The Carnegie Company of Pittsburg has established a new plant for this purpose, which includes a 40-inch mill, the only one of its kind hitherto constructed on either side of the Atlantic. So far has this demand for steel beams, girders, and pillars been carried that nearly 20 per cent of the total production of steel ingots in the United States is absorbed in these specialties.

Another use to which steel is now being largely applied in the United States is that of fireproof flooring. This application is not by any means unknown in our own country, but it appears to have been carried much further in the United States than anywhere else. An interesting paper on the forms and costs of fireproof floors most commonly adopted in America was recently drawn up by Mr. Sabin, and published in *Engineering*. In the appendix to his paper will be found a statement showing the weights and costs per square foot of fireproof floor construction, as used in the United States, in comparison with the usual wooden floor construction. It is stated that the cost per square foot of floor space is 9d. for wooden and 15¾d. for steel fireproof flooring. The principal item of cost in such structures is the H beams, which, however, have lately fallen in price, until they can now be had, punched, fitted, and erected in place in buildings, at, say Chicago, at about 2c. (or 1d.) per pound. Indeed, the cost of structural steel in the United States has of late fallen so considerably that hopes are entertained that the demand will soon double itself. In a recent letter in *Engineering*, Mr. F. H. Kindl, the structural engineer of the Carnegie Steel Co., expresses the belief that the enormous demand which is sure to be created for fireproof (steel) materials will further reduce the already low price, and bring the cost of a fireproof building within the reach of everyone contemplating the erection of a permanent structure. The method of construction usually adopted is to use steel beams and columns for the framework and support the walls at each floor level. I have reproduced from the *Engineering Review* a sketch showing how this is done in the case of a modern fireproof 14-story building in Pittsburg. [The new Carnegie office building, a cut of whose steel frame was first presented in *The Iron Trade Review*.—ED.] And I have also a photograph taken at Chicago a month since by my son, Mr. A. P. Head. It represents a large shop many stories high, and yet scarcely any brick work is as yet to be seen.

An American journal, speaking of the tendency to introduce steel more extensively into buildings, remarks that "the low prices for iron and steel are very certain to work a revolution in the building trades, as they have already done in many others. Buildings which are as nearly fireproof as it is possible to make them, with iron walls, floors, roofs, and staircases, and with brick, stone, or terra-cotta in other parts, can now be erected at a cost but very little beyond what would be involved in putting up the same sized wooden structure. The extra first cost is more than compensated for by the saving in insurance, and the advantages of possessing a more substantial and permanent building, while the expense of maintenance and repairs is decidedly in favor of steel."

It has long been predicted that timber would eventually be superseded by steel in the under-frames of railway cars, if not in the entire framework of all rolling stock. Should this expectation ever be realized, there would unquestionably be a greatly increased demand for iron and steel in a somewhat new direction. The effect of this demand on the iron and steel industries may be estimated by the fact that in the United States alone the rolling stock, excluding locomotives, employed on all the railways increased from 557,000 to 1,091,000 vehicles between 1880 and 1890. It is estimated that at the present time there are at least 2½ million vehicles of all kinds on the railways of the world, without reckoning locomotives. The maintenance and increase of this stock represents a certain demand upon which our steel industries may fairly reckon.

A great deal of attention has recently been given to this matter by American railway engineers, and the subject has been discussed again and again at the meetings of technical societies and in the engineering press. The verdict recorded has been, on the whole, in favor of steel instead of timber. The average life of American timber cars was stated by Mr. J. D. McIlwain, of the Harvey Steel Car Works, at a recent meeting of the Western Railway Club, to be about 12 years, while a steel-frame car would, he thought, last four times as long. It would also not need the work of taking up slack due to shrinkage, which has usually to be done annually for the first two or three years in a timber-made car. He thinks that for the same capacity a steel car should weigh 15 per cent. less than a wooden one, which is a very important consideration.

According to the Master Car Builders' (U. S.) experience of depreciation, an ordinary car, twelve years old, costs more to repair than it is worth, and that fixes its life. The difference in the cost of repairs as between timber and steel is certainly very marked.

At a meeting of the New York Railway Club held on Jan. 18, 1894, Mr. G. R. Joughins, superintendent of motive power of the Norfolk & Western Railroad, gave his experience with regard to two sets of platform cars which had been running under similar conditions on that line—fifty being of timber and fifty of iron. He stated that the total cost of repairs of the timber cars was ten times as much as of those made of iron. The fifty iron cars cost for repairs in three years only $406 and the fifty timber cars $4,264. In the United States the designers of steel railway cars make a practice of using so far as practicable only ordinary easily-rolled sections and simple forgings. As little riveting as possible is resorted to, and rivet holes in the tension flanges of the beams are always avoided.

In a recent communication to the *Engineering News*, Mr. A. E. Hunt, of the Pittsburg Reduction Co., recommends an alloy of aluminum for car frames. He says that this alloy can be furnished in castings which will bend double without fracture, and which will have a tensile strength of 40,000 lbs. per square inch when alloyed with about 3 per cent of hardening ingredients, and will have a specific gravity of less than three, against eight for steel. In drawn tubes, the alloy can be made with a tensile strength of 50,000 lbs. per square inch. and an elastic limit at least one half the ultimate, and it will bend nearly double before fracture. He thinks that by reason of its tensile and compressive strength, its resistance to corrosion, and its lightness, aluminum is the right metal for car frames, and that in a short time it will be largely used for this purpose.

Except in regard to specific gravity (which is not of the first importance in the construction of rolling stock), it seems to me that Mr. Hunt's alloy is in no way superior to steel, while the price, if I am correctly informed, is about 2s. per lb., or twenty-four times as much; and that without much hope of reduction, even when his new works at Niagara are completed. I fear Mr. Hunt will be disappointed in his expectation that his alloy will be used to any considerable extent in railway rolling stock.

The use of iron or steel pit props instead of wood is becoming very general in French coal mines. The initiators of the movement were the Société de Lievin, in the north and the Société de Rochebelle, in the center of France. Since 1879 the first named company have used props of H iron weighing 15½ kilos. per meter. Tests have been made between iron and wood pit props, which show that the latter have to be renewed twice as often as the former.

Here, again, is an application from the adoption of which in this country and some of its dependencies a new demand may be expected. The extent to which timber is used in mining operations is enormous, and, if only it could be shown to be of advantage to substitute steel its use would rapidly extend. The cost of steel is lower in England than in France, so that if it pays to adopt it in the latter country it would be still more likely to pay in the former.

These are but a few of many cases in which the use of steel may be introduced or extended with advantage. Many others might be added. For ornamental purposes, for balconies, doors, windows, conservatories, fencing and a multitude of other uses, steel might often be substituted for brick, stone or timber. It is open to doubt whether as much has been done in promoting its use as might have been done. The German Iron Trade Association have taken great pains, and incurred considerable expense, in publishing a work designed to bring under the eye of all who are concerned in building operations the advantages to be gained by the substitution of steel, and they think this has already had the effect of directing more attention to the subject, and of enlarging the area of steel consumption. Perhaps something of like nature might be done in England with advantage.

Jessop's Steel for Sheep Shears.

The following regarding "Jessop's" Steel, the product of Wm. Jessop & Sons, Ltd., Sheffield, Eng., and New York, appears in a recent contribution to the *Sheffield Daily Telegraph* from its Paris correspondent. Writing of the "French Trade in Sheep Shears" he says: "Every order that comes from the United States is accompanied with the stipulation that the steel used must be Jessop steel, and, in fact, nearly the whole of the shears sent abroad are made of this material. Where possible, makers will employ French steel, but this is only done from patriotic motives, as they have every advantage in employing Sheffield steel, and where quality is the point to be considered no hesitation is felt in taking the material from Sheffield. While conversing with a maker of shears, he mentioned having just placed an order with a native steel maker for 3,000 tons of steel. 'But,' said he, 'where I buy 3,000 tons of steel from France, I take 10,000 tons from Sheffield, and orders for still greater quantities of Jessop steel are given by other firms.' * * * It is very rare that a bar of French steel can be found that possesses a uniform quality its entire length, and the metal is consequently liable to break during the process of tempering. With English steel such accidents scarcely ever happen, with the result that, though Jessop steel costs £6 a ton more than the French steel delivered in Paris, the cost of the shears made therefrom is about the same, as the difference in the price of first material is compensated for in the absence of waste, to say nothing of the superiority of the shears. At the same time it is found that with Jessop steel, the shears can be made quicker and more easily than with steel of native manufacture. For goods intended for export it is asserted that it is practically impossible to use anything but Sheffield steel."

AN order in council has been issued by the Canadian government amending the regulations governing the payment of drawbacks on duties on articles entering into the construction of goods manufactured in the Dominion for export. Hereafter 99 per cent of the duty paid will be refunded instead of 90 per cent. The change will put Canadian manufacturers on a par with those in the United States, this provision being the same as that in the McKinley and Gorman acts.

THE Carnegie Steel Co.'s Cleveland offices, Mr. Chas. W. Baker, manager, have been removed to larger and more convenient quarters—Rooms 802-3 Perry-Payne Building.

CONDITION OF BLAST FURNACES OF U. S.*

November 1, 1894.

Location of Furnaces.	Charcoal.					Bituminous or Coke.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New England	11	2	192	9	810	..	.....	.....	.....	.....
New York	6	1	105	5	615	5	2	2763	3	3335
Pennsylvania	13	1	55	12	985	5	1	1052	4	2840
Pittsburgh	.....	.....	.....	.....	.....	24	23	39230	1	1470
Spiegel	.....	.....	.....	.....	.....	2	2	2234	0	0
Shenango Valley	.....	.....	.....	.....	.....	15	15	15925	0	0
Jun. and Con. Vals	.....	.....	.....	.....	.....	17	7	7403	10	4750
Maryland	6	0	0	6	49	5	0	0	5	5955
Virginia	4	0	0	4	210	23	10	5892	13	7120
North Carolina	.....	.....	.....	.....	.....	1	0	0	1	95
West Virginia	.....	.....	.....	.....	.....	4	2	2391	2	1095
Ohio—Mahoning Val	.....	.....	.....	.....	.....	12	9	11092	3	3970
East, Cent. & North	.....	.....	.....	.....	.....	17	13	14798	4	3965
Hocking Valley	.....	.....	.....	.....	.....	6	0	0	6	2445
Hanging Rock	10	4	264	6	510	11	8	2357	3	605
Kentucky	3	0	0	3	865	6	2	650	4	1770
Tennessee	9	2	382	7	2035	14	6	5038	8	4960
Georgia	3	1	263	2	375	2	1	464	1	740
Alabama	13	3	649	10	2525	38	14	14316	24	15040
Indiana	.....	.....	.....	.....	.....	2	0	0	2	275
Illinois	.....	.....	.....	.....	.....	19	10	18317	9	10990
Michigan	20	6	1635	14	4575	.....	.....	.....	.....	.....
Wisconsin	5	1	807	4	1120	4	1	1310	3	2175
Minnesota	.....	.....	.....	.....	.....	1	0	0	1	665
Missouri	2	1	275	1	305	3	0	0	3	2280
Texas	4	1	172	3	845	.....	.....	.....	.....	.....
Oregon	1	0	0	1	280	.....	.....	.....	.....	.....
Colorado	.....	.....	.....	.....	.....	3	2	2000	1	840
Total char. and coke	110	23	4799	87	16545	239	128	147232	111	77380
Total anthracite (New York, New Jersey, and Lehigh, Schuylkill, Upper and Lower Susquehanna and Lebanon valleys.)	130	37	19383	93	37890	.....	.....	.....	.....	.....

SUMMARY.

Fuel.	In Blast.					Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	23	21	25	4,799	4,601	5,331	87	89	16,545	16,645
Anthracite	37	31	36	19,383	18,537	16,714	93	99	37,890	40,182
Coke	128	119	61	147,232	135,429	62,590	111	120	77,380	85,300
Total	188	171	122	171,414	158,567	84,635	291	308	131,815	142,127

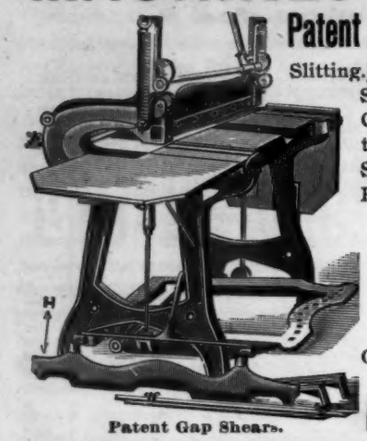
*The above table is condensed from the *American Manufacturer*. The tables of the *Iron Age* show in blast Nov. 1, 22 charcoal furnaces, with 4,694 tons weekly capacity, instead of 4,799: 36 anthracite, with 18,600 tons weekly capacity, instead of 19,383: and 123 coke, with 135,572 tons weekly capacity, instead of 147,232. Total, 181 active furnaces, with a total capacity of 158,866 tons, instead of 171,414, as above.

Connellsville and the Otto-Hoffman Process.

In reproducing *The Iron Trade Review's* article on the introduction into the United States of the Otto-Hoffman system of coke making, with recovery of by-products, the Connellsville *Courier* adds an expression of opinion on behalf of the coke producers of that region:

"If the Otto-Hoffman process of coke making is as successful in this country as it is on the Continent it will undoubtedly have some effect on the operations of the Connellsville region. Consumers in the West, where a large percentage of the shipments go, could make their own fuel from their own coals, and thus save the profit that the operators here make on it, besides the freight. But the cost of erecting Otto-Hoffman plants is going to be an item of much consideration. The cost of building a block of 60 Otto-Hoffman ovens is a great deal larger than that required to put up 60 beehive ovens. The operating expenses are also greater. For these reasons the operators in this region say the new process will not come into general use, at least not until the production of the Connellsville region begins to decline, and that will not be for a score of years or more. They admit, however, that new inventions and improvements on the present method may bring the Otto-Hoffman process of coke manufacture in the United States into close competition with the Connellsville region long before that time."

MACHINES FOR WORKING SHEET METAL



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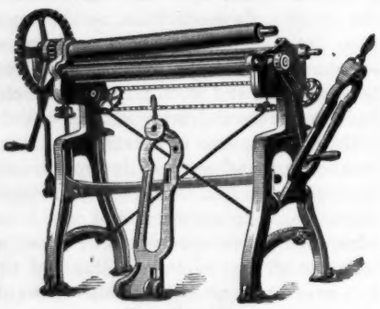
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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

"Fuller," 188 S. Water st., Chicago, wants to buy a small foot lathe.

Warren Springer, 207 S. Canal st., Chicago, will buy a 25 h. p. motor and a second-hand crane hoisting engine.

W. W. Sprague & Co., 49th st., near Halsted, Chicago, are in the market for a 12 to 15 h. p. high speed, automatic cut-off engine.

New Construction:—

The freight house of the Southern Railway at Asheville, N. C., which was burned last week, will be rebuilt on an enlarged scale and work has already commenced.

The St. Louis Southwestern is building a new freight and passenger station at Pine Bluff, Ark., to replace the one destroyed by fire a few months ago. The new station will be ready for use in January.

At Lake View, Wis., the work of building the new rolling mill is going rapidly forward. The frame is up and the foundations for the machinery laid. The mill will be ready for operation, it is thought, by March 1 next.

Fires and Accidents:—

The iron foundry of Hodge & Ladaman, at North Adams, Mass., was so badly damaged by fire that it will have to be rebuilt.

The factory of the Bettendorf Metal Wheel Co., at Davenport, Iowa., burned, with a loss estimated at $40,000; insured for $18,000.

Additions, Enlargements, Removals, Etc.:—

The Adams Co., of Dubuque, Iowa, has just finished a large addition, 28x40 feet, making its foundry 115x140 feet.

The Keystone Bridge Works of the Carnegie Steel Co., are to be removed to Homestead, it is reported, in the coming year.

An additional factory, 50x100 feet, which the Hartman Mfg. Co., of Ellwood City, Pa., are putting up will be occupied early in December.

The Stewart Iron Works, manufacturers of iron and steel for jails, and of architectural and structural iron work, will remove from Wichita, Kan., to Cincinnati; it is expected they will be installed at Cincinnati by Dec. 1.

The Wagner Mfg. Co., of Sidney, O., has just completed an addition to its foundry buildings, and has added a number of machines to its finishing department.

A steel building, 80x80 feet, is under construction by the Ellwood Shafting & Tube Co., Ellwood City, Pa., considerably increasing its capacity to produce seamless tubing.

The shops of the Chesapeake, Ohio & Southwestern, now located at Paducah, Ky., are to be removed to some other town on the road not as yet selected. The receivers have applied to the court, asking the necessary permission for the removal of the shops, which will probably be rebuilt at Louisville, Ky.

General Industrial Notes:—

The Braddock Wire Works have started up anew.

Pittsburg Stove Works at Braddock have shut down and will be inactive for a month.

American Wire Nail Works, Anderson, Ind., are running night and day with full force.

The South mills of the Lackawanna Iron & Steel Co., at Scranton, Pa., started up Nov. 11.

The Spring Lake Iron Co., of Fruitport, Mich., are preparing to put their charcoal furnace in blast.

The name of the Buchanan Bridge Co., Bellefontaine, O., has been changed to Bellefontaine Bridge Co.

Norton Iron Works stockholders met at Ashland, Ky., and appointed a committee to lease or rent the plant.

At the Duquesne Forge, Rankin, Pa., another furnace and hammer will start, employing 25 additional men.

The stove foundry recently moved to Manchester, Adams Co., O., by parties from Ironton, O., has started up.

The Barnum & Richardson Co., East Canaan, Conn., will not blow in their No. 1 furnace until business improves.

The Lakeside Iron Works of H. C. Taylor, at Marquette, Mich., have been reopened after a general overhauling.

At the Homestead Steel Works, the 33-inch, 35-inch and 40-inch mills and the converting mill are shut down for repair.

The Edgar Thomson Steel Works turned out 35,900 tons of rails in October. The best previous month's record was 33,000 tons.

It is understood that an effort is being made to reorganize the Kellogg Seamless Tube Co., with the object of operating the plant at Findlay, O. The project includes buying up the indebtedness of the old company at 50 cents on the dollar, and

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the formation of a new company, to be known as the Kellogg Weldless Tube Co.

Secretary Lovejoy, of the Carnegie Steel Co., denies that any addition is to be built to the armor plate plant at Homestead.

At the Midland Steel Works, Muncie, Ind., the new open-hearth furnace is about completed and its operation will soon begin.

At Reading, Pa., the Reading Iron Co., placed its anthracite blast furnace No. 1 in operation last week. Its weekly capacity is 500 tons.

The four blast furnaces which the Carnegie Steel Co. will build at Duquesne, Pa., will have a capacity of 350 to 400 tons each every 24 hours.

The trouble with the straighteners at the Edgar Thomson Steel Works is still unsettled. Fifty men are at work in place of the 150 who quit.

The Hoosier Drill Works, Richmond, Ind., recently declared a two per cent dividend. It announces that the present rate of wages will continue.

The nail mill of the Carnegie Steel Co., at Beaver Falls, Pa., is running up to midnight every night to fill a large order for special sizes, to be shipped by lake.

The Greensburg Steel Co.'s plant, at Greensburg, Pa., long idle, will probably be started up soon. A new crucible furnace of 12 pots has been added to the plant.

Car building: The Youngstown Car Co. has contracted to build 200 coke cars for the Pittsburg & Lake Erie. The Southern Railway Co. has given an order to the Lenoir Car Works, of Lenoir City, Tenn., for 250 hopper bottom coal cars of 60,000 lbs. capacity.

Using two-thirds Mesabi Mountain ore, and less than a ton of coke to a ton of iron, Edith furnace of the Hainesworth Steel Co., Allegheny, Pa., made in October 7,744 gross tons of Bessemer pig. The best week's record was 1,800 tons, and the best 24-hour record, 282 tons. John Reis is manager.

The Lodge & Shipley Mfg. Co., of Cincinnati, noted an improvment in business in September and there has been further betterment since the beginning of the present month. At present 35 men are employed and the company expects, as orders are increasing, to put more to work. In the past 18 months the largest number of men employed at any timwas 70.

It is reported that further important additions are to be made to the armor plate plant of the Bethlehem Iron Co., at South Bethlehem, Pa. Two large open hearth furnaces are to be added to the four now in place, and a great plate rolling train is to be installed in the same building. A part of the foundations of the plate mill was laid years since in another building.

The Frank-Kneeland Machine Co., Pittsburg, has put in operation the third Shaw electric crane. It has two trolleys in the same bridge, arranged to pass each other. The company is busy with orders for mill equipment, and is engaged on tin plate machinery for the Goldsmith & Loewenberg mill at New Kensington, Pa., and the Crescent Sheet & Tin Plate Co.'s plant at Cleveland.

The Eastman Kodak Co. is installing in its works at Rochester, N. Y., a system of narrow gauge cars and tracks by which cars loaded with glass may be transferred from one track to any number of tracks parallel to it. To accomplish this they are to use a transfer car with rails on top which runs on an auxiliary track perpendicular to the others. This system of cars and tracks is the design of the C. W. Hunt Co., of New York.

When the iron firm of Moorehead & McCleane Co., of Pittsburg, failed three years ago, M. K. Moorehead indorsed a note for $150,000 which was discounted by Pittsburg banks, the mill by this means being enabled to continue operations. This note has gone to protest, and the creditors refuse to grant an extension of time. George S. Griscom, president of the company, says the business depression of the last two years is the cause of the trouble.

A number of Youngstown, O., men are interested in the rolling mill now being established at Lakeview, Wash., near Tacoma, most of the machinery being removed from Burlington, Ia. The foundations for the roll trains and engines are completed. There will be four buildings, 122x198 feet, 115x68 feet, 60x60 feet, and 40x60 feet. The mill has but little competition out there, as the nearest mill is at San Francisco, Cal., and it is forced to get coal from Washington. As the Burlington mill is near the coal districts it will be able to save enough in coal to pay the freight on iron.

The White River Iron & Steel Co., of Muncie, Ind., has been on the point of coming out of its receivership several times in the past year, but a transfer to new hands after a sale of the property is the present programme. A Muncie dispatch says: "It is now very nearly a settled fact that T. F. Rose will get the White River Iron & Steel Works on his bid of $20,000, made at the receivers' sale last week. Mr. Rose is representing other people who have capital that will push the mill to success, and the idle machinery will very likely soon be started. The mill employs 20 hands when at work."

Burning Coal Dust.

A new coal dust burning appliance has been recently described in an English journal. Some particulars respecting the invention have also appeared in the German technical papers, it being stated on the authority of Dr. Kosman, that an economy in cost on the base of Berlin coal prices is effected by the use of the appliance, of no less than 47.6 per cent. It has been working since the beginning of this year in the vicinity of Berlin; in one case in connection with a small tubular boiler supplying a 12 h. p. engine, in which an average of 732 lbs. of coal dust were consumed per 24 hours' working. Fitted to a Cornish boiler at the glass works of Messrs. Ebert & Neumann, Berlin, supplying a 50 h. p. steam engine, it consumed 5,738 lbs. of ground steam small against 7,085 lbs. of best gas coal formerly required.

For the Preservation of Metals in Roofs, Bridges, Etc.

At the Montreal meeting of the American Society of Mechanical Engineers, an interesting paper was read on methods for preserving metal used in pipes, roofs, bridges, poles, construction work, etc. In conclusion, the question how best to protect iron and steel from corrosion in all the varying conditions of the usages of to-day, resolves itself into several "Dont's," to wit: Don't have any scale on the metal. Don't paint it with anything but pure linseed oil, and oxide of lead or graphite paints. Don't forget that frequent inspection and care are very necessary. Don't let the cost and interest accounts be the governing factors in the case of protecting any metal structure on whose continuity and strength human life and safety depend. In comparing the two paints recommended the following points are made as to the durability and protecting power of graphite paint: Graphite has a strong affinity for metal surfaces, and experienced painters claim that even where light colors are desirable, graphite paint should be used as a priming coat. Graphite is impervious to the action of heat, cold, sea air, acid or alkali fumes, which are more or less destructive agents to lead paints. The Joseph Dixon Crucible Co., Jersey City, N. J., have manufactured a pure linseed oil and graphite paint for over 25 years, and have strong testimonials of its value.

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THE total of bank clearings in the chief cities of the country in October, as reported by Bradstreet's, is the largest for any one month since June, 1893. The gain over September of this year is 21 per cent., and over October of last year 6.3 per cent. For the first ten months of the year the total is still behind the same period of 1893 and far behind 1892.

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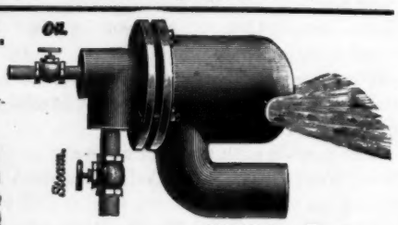

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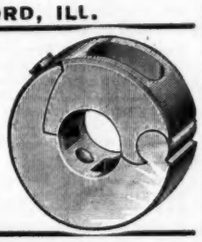

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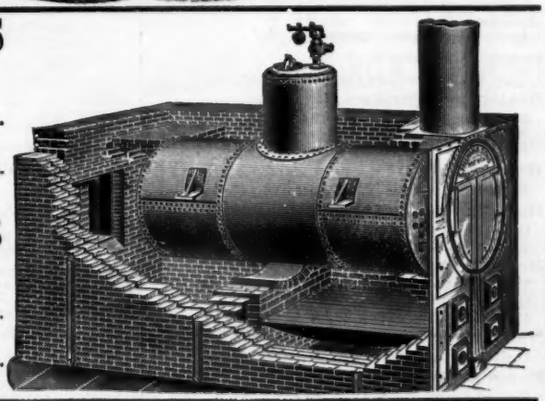

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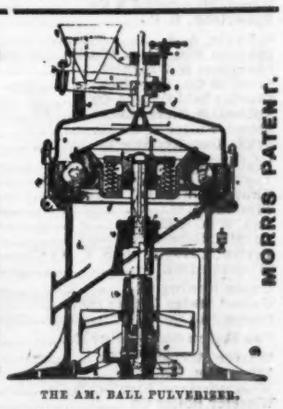

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Lake Superior Charcoal	$13 00@$14 50
Local Coke Foundry No. 1	10 25@ 10 50
Local Coke Foundry No. 2	10 00@ 10 25
Local Coke Foundry No. 3	9 50@ 10 00
Local Scotch Foundry No. 1	10 75@ 11 00
Local Scotch Foundry No. 2	10 00@ 10 50
Local Scotch Foundry No. 3	9 50@ 10 00
Southern Coke No. 1	11 00@ 11 25
Southern Coke No. 2	10 25@ 10 50
Southern Coke No. 3	10 00@ 10 25
Southern No. 1 Soft	10 25@ 10 50
Southern No. 2 Soft	10 00@ 10 25
Southern Silveries No. 1	11 50@ 11 75
Southern Silveries No. 2	11 25@ 11 50
Jackson Co. Silveries	15 00@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	13 00@ 13 50
Alabama Car Wheel	17 50@ 18 00
Malleable Bessemer	10 50@ 11 25
Coke Bessemer	11 25@ 11 50

CINCINNATI (reported by Rogers, Brown & Co.)

Southern Coke No. 1, Foundry	$10 00@$10 25
Southern Coke No. 2 and No. 1 Soft	9 50@ 9 75
Hanging Rock Coke, No 1	12 00@ 12 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Stone Coal No 1	14 50@ 15 00
Southern Coke, Grey Forge	8 50@ 8 75
" " Mottled	8 25@ 8 50
Standard Alabama Car Wheel	15 75@ 16 75
Tennessee " "	15 50@ 16 00
Lake Superior " "	14 00@ 14 50

BUFFALO (reported by Rogers, Brown & Co.)

No. 1 Foundry Strong Coke Iron Lake Superior Ore	$11 75
No. 2 Foundry Strong Coke Iron Lake Superior Ore	11 25
Ohio Softener No. 1	12 25
Jackson Co. Silvery No. 1	15 75@ 16 75
Lake Superior Charcoal	13 50
Tennessee Charcoal	15 50
Southern Soft No. 1	11 50
Southern Soft No. 2	11 50
Alabama Car Wheel	16 00@ 17 50
Hanging Rock Charcoal	18 50

LOUISVILLE (reported by Geo. H. Hull & Co.)

Southern Coke No. 1 Foundry	$10 00@$10 50
Southern Coke No. 2 Foundry	9 25@ 9 50
Southern Coke No. 3 Foundry	8 75@ 9 00
Gray Forge	8 50@ 8 75
Southern Charcoal No. 1 Foundry	12 50@ 13 50
Car Wheel	15 00@ 15 50
Spathite	11 25@ 11 75

ST. LOUIS (reported by Rogers, Brown & Meacham):

Southern Coke No 1	$10 75@$11 25
Southern Coke No. 2	10 25@ 10 75
Southern Coke No. 3	9 75@ 10 00
Southern Gray Forge	9 50@ 9 75
Southern Charcoal No. 1	14 00@ 14 50
Missouri Charcoal No. 1	12 50@ 13 00
Ohio Softeners	14 00@ 14 50
Lake Superior	15 50@ 16 00
Southern	16 75@ 17 00
Connellsville Coke, St. Louis	4 50

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	GROSS TONS
Old iron rails	$12 50
Old steel rails	10 00
	NET TONS
No. 1 R. R. wrought scrap	$ 9 50
No. 1 wrought scrap	8 50
No. 1 Machine cast scrap	8 50
Iron axles	15 50
Axle turnings	8 00
Wrought turnings (free from cast)	6 50
Cast borings	5 50
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 50
Pipes and flues (clean)	7 00
Tank iron	6 75
Hoop and band iron	6 00
Sheet iron	5 00
Wrought drillings	6 50
Malleable iron	7 00

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.

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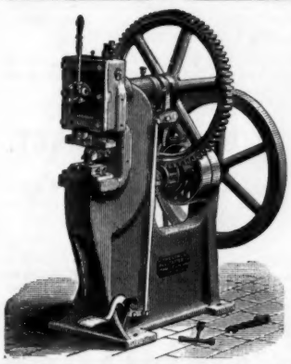

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NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.
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USED BY NEARLY ALL THE RAILROADS.

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Beams and Channels (f. o. b. mill)	1.35c@1.35c
Angles	1.20c@1.25c
Tees	1.35c@1.45c
Universal Plates	1.20c
Sheared Plates	1.30c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 30
4¼ to 6 by ⅜ to 1 inch	1 35
1¾ to 6 by 1⅛ to 2 inch	1 50
1¼ & 1⅜ by ⅜ to ¾ inch	1 35
1 & 1⅛ by ⅜ to ¾ inch	1 40
⅝, ¾, ⅞, by ⅜ to ⅝ inch	1 50

Round and Square.

1 to 1⅞ inch	1 30
2 to 2⅝ inch	1 40
2¾ to 3¼ inch	1 55
3⅜ to 4 inch	1 80
4⅛ to 4½ inch	2 40
4¾ to 5 inch	2 60

Oval.

⅞ to 1¼ inch	1 50
⅝ to ¾ inch	1 50
½	1 70
⅜	1 90

Half Oval and Half Round.

1¼ to 3 inch	1 85
⅞ to 1½ inch	1 65
⅝ to ¾ inch	1 90
½	2 05
⅜	3 15

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 40
1 to 1⅜ by ¼ and 5-16 inch	1 45
¾ to ⅞ by ¼ and 5-16 inch	1 55
½ to ⅝ by ¼ and 5-16 inch	1 80

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 85
1 7-16 to 2, No. 17, 18 and 19	1 90
1 7-16 to 2, No. 20	2 00
1 7-16 to 2, No. 21	2 10
1 7-16 to 2, No. 22	2 20
1⅛ to 1⅜, No. 13, 14 and 15	1 90
1⅛ to 1⅜, No. 16, 17 and 18	1 95
1⅛ to 1⅜, No 19 and 20	2 00
1⅛ to 1⅜, No. 21	2 10
1⅛ to 1⅜, No. 22	2 20
15-16 and 1 inch, No. 13, 14 and 15	1 85
15-16 and 1 inch, No. 16, 17 and 18	2 00
15-16 and 1 inch, No. 19 and 20	2 10
15-16 and 1 inch, No. 21	2 20
15-16 and 1 inch, No. 22	2 30
⅞, No. 13, 14 and 15	2 10
⅞, No. 16. 17 and 18	2 20
⅞, No. 19 and 20	2 30
⅞, No. 21	2 40
⅞, No. 22	2 50
13-16, No. 13, 14 and 15	2 20
13-16, No. 16, 17 and 18	2 30
13-16, No. 19 and 20	2 40
13-16, No. 21	2 50
13-16, No. 22	2 60
¾, No. 13, 14 and 15	2 30
¾, No. 16, 17 and 18	2 45
¾, No. 19 and 20	2 55
¾, No. 21	2 65
¾, No. 22	2 75
11-16, No. 13, 14 and 15	2 55
11-16, No. 16, 17 and 18	2 60
11-16, No. 19 and 20	2 70
11-16, No. 21	2 80
11-16, No. 22	2 90
11-16, No. 23	3 00
⅝, No. 13, 14and 15	2 60
⅝, No. 16, 17 and 18	2 70
⅝, No. 19 and 20	2 80
⅝, No. 21	2 90
⅝, No. 22	3 00
⅝, No. 23	3 10
9-16, No. 13, 14 and 15	2 80
9-16, No. 16, 17 and 18	2 90
9-16, No. and 20	3 00
9-16, No. 21	3 10
9-16, No. 22	3 20
9-16, No. 23	3 30
7-16 and ½ inch, No. 13, 14 and 15	3 00
7-16 and ½ inch, No. 16, 17 and 18	3 10
7-16 and ½ inch, No. 19 and 20	3 20
7-16 and ½ inch, No. 21	3 30
7-16 and ½ inch, No. 22	3 40
7-16 and ½ inch, No. 23	3 50
⅜, No. 13, 14 and 15	3 50
⅜, No. 16, 17 and 18	3 60
⅜, No. 19 and 20	3 70
⅜, No. 21	4 00
⅜, No. 22	4 10
⅜, No. 23	4 25

Light Band.

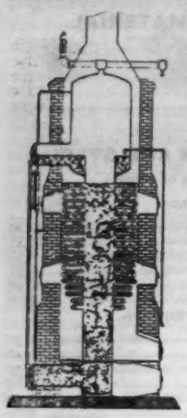
1½ to 6 by ⅛ to 3-16 inch	1 60
1½ to 6 by Nos. 11 and 12	1 65
1 to 1⅜ by ⅛ to 3-16 inch	1 65
1 to 1⅜ by Nos. 11 and 12	1 70
⅞ and 13-16 by ⅛ to 3-16 inch	1 80
⅞ and 13-16 by Nos. 11 and 12	1 85
¾ and 11-16 by ⅛ to 3-16 inch	1 90
¾ and 11-16 by Nos. 11 and 12	1 95
⅝ and 9-16 by ⅛ to 3-16 inch	2 05
⅝ and 9-16 by Nos. 11 and 12	2 10
½ by ⅛ to 3-16 inch	2 20
½ by Nos. 11 and 12	2 25

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 80
⅞ inch, " " " " 13 and 14	1 90
¾ inch, " " " " 11 and 12	1 95
¾ inch, " " " " 13 and 14	2 15

Sheet Iron.

No. 10	1 85
No. 12	1 90
No. 14	1 95



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WATER TUBE BOILER.

This Boiler is absolutely safe from explosion. Gives as much steam from the waste heat as any boiler made. Easy of access for cleaning and repairs. Furnishes perfectly dry steam. Occupies little ground space. Economical in first cost. Send for complete circulars giving list of users and testimonials, one of which is printed below.

The Falcon Tin Plate & Sheet Co., }
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By Warner Arms, Pres't.

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Blooms, Billets, and Slabs, Steel Rails, Steel Beams, Channels and Angles. Steel Forgings, Bar Spring, and Sleigh Shoe Steel. Steel Wire of all kinds. Barbed Wire, Iron and Steel Plates, Galvanized and Black Sheet Iron and Steel Corrugated Iron Roofing.

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Moffet Portable Drill

UNSURPASSED AS A REAMER.

Weighs 48 pounds and drills from 3/8 to 2 inches diameter.

Runs with Steam or Compressed air.
Will Work in Any Position.
An Economical Substitute for Rachet Drilling.
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FLEHARTY, J. H. & Co., Rubber Stampes Seals, Stencils, Automatic Check Punchs, and Numbering Machines. 92 Seneca St.

No. 15-17	2 05
No. 18	2 20
No. 20	2 30
No. 22-24	2 40
No. 25-26	2 50
No. 27	2 60

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 60
Shell	1 85
Flange	2 10
Marine Flange	2 35
Fire Box	3 35

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. ₩ extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. ₩s.
1 to 2 in. inclusive	08
9-16 to ½ in.	08½
7-16 to ⅜ and 2⅜ to 3 in.	09
3⅜ to 4 in.	09½
⅝ to 11-16 and 4⅛	10
⅛ to 6 in.	10½
¼ to 9-32 and 6¼ to 7 in.	11
3-16 in	13

Flats.

	cts. ₩s.
2 to 9-16 in. wide by 2 to ⅝ thick	8

Bessemer and O. H. Steel.

Machinery	base price,	1 80
Tire	"	1 85
Spring	"	2 20
Sleigh Shoe	"	2 20
Toe Calk	"	2 05
Cutter Shoes, tapered and bent	"	2 45

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 70
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 40

MACHINERY SUPPLY MARKET.

Anvils.

American	₩ ₩ 9@10
Wright's	₩ ₩ 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single,	dis 40
Munson s Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis 45

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 15
Horton's Universal	dis40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	₩ 3½
Iron, steel points	₩ lb 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 54 to Flour, C. F		
	46 gr.	150 gr.	F. FF.
Kegs, ₩ ₩	4½c	5 c	2½c
½ kegs ₩ ₩	4¾c	5¼c	2¾c
¼ kegs ₩ ₩	5 c	5½c	3 c
10 ₩ cans, 10 in case	6 c	6¾c	5 c
10 ₩ cans less than 10	10 c	10 c	7½c

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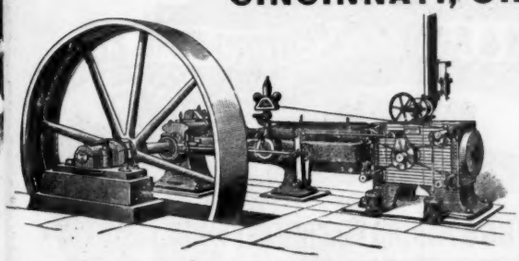
CINCINNATI, OHIO.



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COLLECTS NO MOISTURE FROM UNDER SIDE. NO DRIPPINGS.

Resists acids and gases arising from inside o FOUNDRIES, IRON WORKS, MILLS, ETC.

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WATER TUBE

BOILER.

SAFE,

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DURABLE.

The best boiler made for the use of gaseous fuel at blast furnaces, puddling and heating furnaces.

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JOHN ADT & SON,

NEW HAVEN, CONN.

Builders of Machinery for Hardware Manufacture.

AUTOMATIC

Wire Straightening and Cutting Machines,

BUTT MILLING MACHINERY,

Butt Drilling Machinery,

Riveting Machines,

Foot Presses,

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SPEND YOUR OUTING ON THE GREAT LAKES.

Visit picturesque Mackinac Island. It will only cost you about $12.50 from Detroit; $15 from Toledo; $18 from Cleveland, for the round trip, including meals and berths. Avoid the heat and dust by traveling on the D. & C. floating palaces. The attractions of a trip to the Mackinac region are unsurpassed. The island itself is a grand romantic spot, its climate most invigorating. Two new steel passenger steamers have just been built for the upper lake route, costing $300,000 each. They are equipped with every modern convenience, annunciators, bath-rooms, etc., illuminated throughout by electricity, and are guaranteed to be the grandest, largest and safest steamers on fresh water. These steamers favorably compare with the great ocean liners in construction and speed. Four trips per week between Toledo, Detroit, Alpena, Mackinac, St. Ignace, Petoskey, Chicago, "Soo," Marquette and Duluth. Daily between Cleveland and Detroit. Daily between Cleveland and Put-in-Bay. The cabins, parlors and staterooms of these steamers are designed for the complete entertainment of humanity under home conditions; the palatial equipment, the luxury of the appointments, makes traveling on these steamers thoroughly enjoyable. Send for illustrated descriptive pamphlet. Address A. A. SCHANTZ, G. P. & T. A., D. & C. Detroit, Mich.

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Emery Cloth and Paper.

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H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	12c
" " " " over 5 lbs	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3½	3¼
Hexagon	15½	11½	8½	6	5¾	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₰ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ₰ keg card rate	
{ Car lots	$1.10
{ Less than car lots	$1.25

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₰ doz	dis 10@10&10

Packing, Steam.

Boston Belting Co.	dis 60
American Packing Hemp	₰ lb 9@10
Russia " "	₰ lb 14
Italian " "	₰ lb 13@19
Plumbago Piston	₰ lb 40
Peerless	₰ lb 60
Morrison's "	₰ lb 45
Square Flax "	₰ lb 50
Sheet Rubber	₰ lb 12&24
Excelsior Rubber	₰ lb 48
Rainbow { Full Rolls	45c ₰ lb
Rainbow { Less than Full Rolls	50c ₰ lb
Eclipse Gasket	₰ lb 75

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Rivets.

Iron, Thousand, list November 17, 1887	dis 50&10@60
Iron, Ordinary, Cooper's Block and Carriage list November 17, 1887	dis 50&10@60
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&10
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	dis 20
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40&45
" Mill, Mulay and Drag Saws	dis 40&10
" Wood Saws	dis 40&10
" Silver Steel Diamond Cross-cut Saws	70c per ft
" Dexter Cross-cuts	50c "
" Diamond "	30c "
" Tuttle Tooth Cross-cuts	25c "
" One-man Cross-cuts	32c "
No. 1 Handles	23c per pair
No. 6 "	16c "
Excelsior Saw Tools	$6 per doz
Derfection "	$15 "
Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₩ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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Pittsburgh and Bellaire	† 7.45 am	†11.55 am
Pittsburgh, Bellaire and East	†12.45 pm	† 6.25 pm
Philadelphia and New York	* 1.40 pm	*11.15 am
Baltimore and Washington	* 1.40 pm	*11.15 am
Alliance and Pittsburgh	* 1.40 pm	*11.15 pm
Ravenna and Alliance	† 3.25 pm	† 9.50 am
Hudson and Ravenna	* 5.10 pm	* 8.15 am
Philadelphia and New York	*11.10 pm	* 5.25 am
Baltimore and Washington	*11.10 pm	* 5.25 am
Alliance and Pittsburgh	*11.10 pm	* 5.25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8.40 am	* 5.15 pm
Akron, Columbus & Zanesville	†12.45 am	*11.55 pm
Akron and Columbus	* 8.40 pm	*5.15 pm
Akron and Orrville	† 3.25 pm	† 9.50 am
Columbus and Cincinnati	* 8.00 pm	* 7.00 am

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	Arrive.	Depart.
Akron & Canton	*6:35 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:35 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Garrett	†3:00 P M	†11:00 A M
Wooster		*6:30 P M
Akron, Canton & Marietta	†3:00 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†3:00 P M	†11:00 A M

†Daily except Sunday. *Daily. Pullman's Palace Vestibule Drawing Room cars between Cleveland and Chicago.

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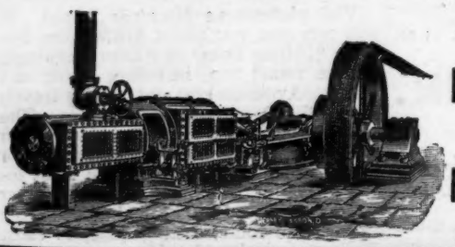

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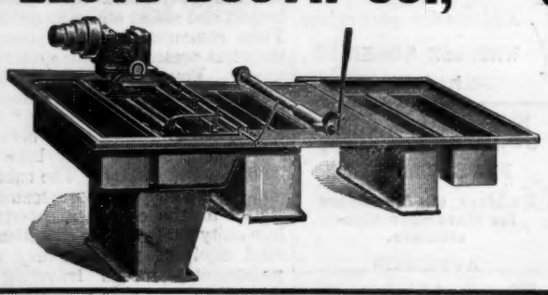

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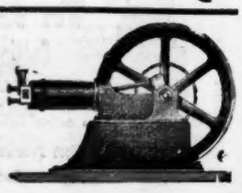

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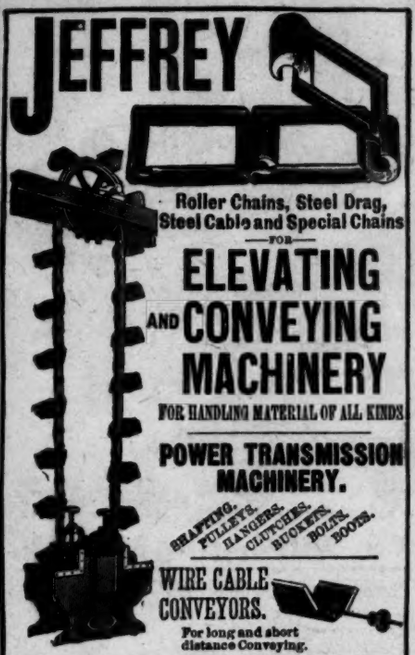

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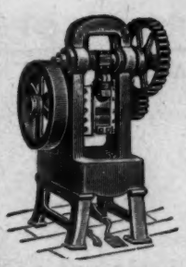

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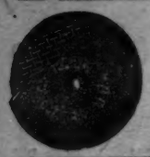

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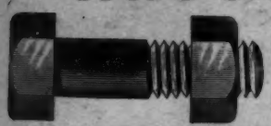

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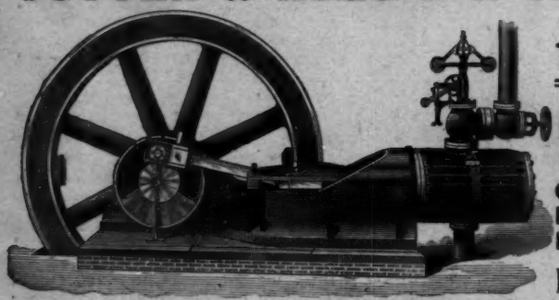

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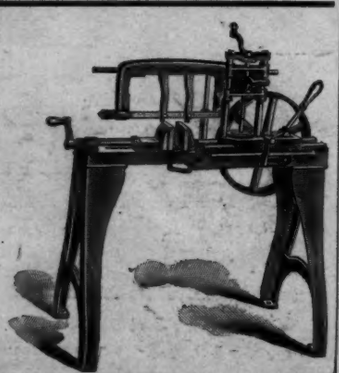

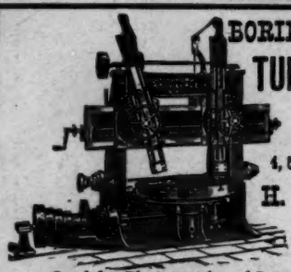

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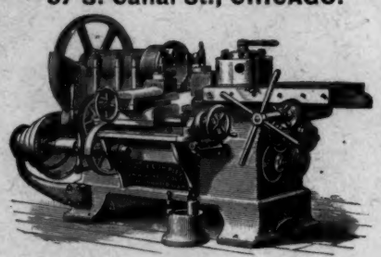

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